

A STUDY OF DYES AND DYES-INTERMEDIATES INDUSTRY AT BARODA

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It is certified that the work contained in the thesis entitled " **A STUDY OF DYES AND DYES-INTERMEDIATES AT BARODA** " by **Sanjeev Mehta**, has been carried out under my supervision and that this work has not been submitted elsewhere for a degree.



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ABSTRACT

In India, there have been major changes in the government policies in the past four years as a part of ongoing economic reforms. These reforms have changed the environment of the industries radically and have also made a major impact on the industry structure. Now the objective is to reap benefits of economies of scale. The small scale firms are specially finding it very difficult to cope with these changes.

The chemical industry enjoys the status of being the third largest foreign exchange earner for the country and in this export dyes and dyes intermediates industry has a share of 20 %. The exports of dyes & dyes intermediates industry has increased from Rs. 5,000 million in 1990-91 to an impressive Rs. 13,000 million in 1993-94, but it represents only 4 % of the world consumption. The production of dyes and dyes intermediates is shifting to developing countries from the developed ones, because of the large scale pollution hazards of the industry and differences in labour costs. This industry is an important input in many industries like textiles, leather, paints, inks, plastics, etc. Moreover, this industry is populated by a large number of small scale manufacturers. The government policies are having a significant impact on the industry.

The broad research questions were aimed to find out the current status of the industry, its structure and operation of different groups in the industry. The impact of the government policies on the industry was also analysed. The study was conducted through a survey of small and medium scale units Baroda, which is one of the main centres producing dyes and dyes intermediates in the country. The method of data collection used in the study was of survey through non scheduled - structured interviews.

The findings of the study are that there are four major factors which restricts the entry into the industry : economies of scale, access to distribution channels, product differentiation and government policies. The suppliers as well as buyers have high

bargaining power vis-a-vis the industry. There are four groups present in the industry : small scale firms, medium scale firms, integrated firms and export oriented firms. These groups have different benefits and they operate to take full advantage of these benefits.

Due to changes in the government policies, like import policy and licensing policy the number of suppliers are increasing, which will help the industry to source the raw material easily. The pollution control norms have become stringent over the years and that has increased the cost of production due to which the small scale firms are finding it difficult to compete with large scale and medium scale firms. The government reservation policy for small scale sector has increased the number of small scale firms and restricted the large and medium scale firms from manufacturing those particular dyes. These are some of the effects of the changes in the government policies on the industry.

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CHAPTER 1

INTRODUCTION

1.1 SIGNIFICANCE OF THE STUDY

In India, there have been major changes in the government policies in the past four years as a part of ongoing economic reforms. These consist of new industrial policy, new trade policy, changes in excise structure, changes in pollution control norms and so on. These changes have brought many new opportunities as well as threats to the industries and has influenced different types of industries at all levels. Until 1990s, the government policies were protecting the Indian manufacturers from the international competition. But since 1991, the protection to the industries has been gradually reduced. Also the foreign firms are allowed easy entry by encouraging foreign direct investment, joint collaboration, etc. These changes have changed the environment of the industries radically and is also a major impact on the industry structure. Previous policies emphasised on encouraging entrepreneurs to set up small scale firms by concessions in form of subsidy, reduced duty and reserving some items exclusively for them. Now the policies are such that these are encouraging to set up plants with large capacities. For example, government has allowed capital goods costing more than Rs. 20 crores with no import duty in 1995-96 budget. Now the objective is to reap benefits of economies of scale. The pollution control norms are becoming stringent and to keep the cost of production down, the firms have to set up large capacities. The small scale firms are specially finding it very difficult to cope up with these changes.

The Indian Chemical industry has also been affected by these reforms. Presently, the chemical industry enjoys the status of being the third largest foreign exchange earner

for the country. It represents over 12 % of Indian Industry's total manufacturing output, accounts for 13 % of the manufacturing industry's generated wealth and 8 % of the total exports. Trade in chemicals to and from India has increased substantially. Exports have risen from Rs. 24.75 billion in 1990-91 to Rs. 67.85 billion in 1993-94. Exports are targeted to grow by over 400 % by the year 2000. A major part of the export market is made up of pharmaceuticals (35 %) followed by the dyes and dyes intermediates^{1 1} industry (20 %). The exports of dyes & dyes intermediates has increased from Rs. 5,000 million in 1990-91 to an impressive Rs. 13,000 million in 1993-94, but it represent only 4 % of the world trade of the dyes & its intermediates.

The major producers of dyes and its intermediates are Germany, Switzerland, UK, USA, Japan, South Korea, Taiwan, China, Indonesia, etc. Germany, USA, Japan, Switzerland and the UK account for almost two-thirds of the total world annual dye production of around almost 6.5 lakh tones. Since the industry has enormous environmental hazards, of late it has been facing stiff opposition from the environment protection groups, especially in some of the developed countries. Labour costs have also gone up sharply in these countries. Several units engaged in the manufacture of dyes and dyes intermediates have been closed down over the years. This has helped the dyes & dyes intermediates producing industries of the developing countries like India, Taiwan, China, Indonesia, etc. to fill the supply void created by the closure of many of the producing companies in the western countries in recent period. This trend is likely to continue and hence the developing countries including India have a good opportunity to increase their share in the world market.

Dyes form an important input in many industries such as textiles, paints, plastics, leather, inks etc. Textile industry is the number one foreign exchange earner for the

¹ The majority of the dyes are obtained from intermedaites which have been previously synthesised. The dyes intermediates are prepared from basic raw materials i.e. benzene, toluene, etc. by one of the unit processes like sulphonation, nitration etc. Hence dyes intermedaiates manufacturing is first step to manufacture dyes. This is the difference between dyes & dyes intermediates.

country and is the largest consumer of the dyes in India. Leather industry is the number four foreign exchange earner for the country and it also consumes a sizable amount of the dyes. Both the industries are expected to grow, both internationally as well as domestically and hence the domestic demand for dyes is expected to rise sharply in coming years.

At present, the dyes & dyes intermediate industry is populated by 950 firms, out of which 900 units are in the unorganised sector, which consists of small scale firms in large numbers. Hence, the changes in government policy, explained earlier in the section, are going to affect the industry very much.

The above mentioned facts raise certain very interesting questions about Indian Dyes & Dyes Intermediate industry which are discussed in section 1.3.

1.2 SIGNIFICANCE OF BARODA

There is hardly any work on topic of this kind in dyes & dyes intermediates industry. The main reason may be that the firms in the industry are very secretive about their operation. One of the reason for keeping secrecy is that the processes for manufacturing the dyes & dyes intermediates have been standardised and the only thing which helps the firms to achieve good yield and quality is knowledge of process characteristics and parameter values which they know due to their experience in the industry. They guard this information jealously. The other reason is that they fear that the survey conducted by anybody is for finding out the buyers & suppliers of the firms and weak points of their operation so as to take advantage of them. In Baroda we have contact who is engaged in manufacturing of certain chemicals. Through this contact it was possible to get in touch with the dyes & dyes manufacturers at Baroda. Baroda is also one of the major centres of the industry and is discussed in more detail in section 4.3. Hence Baroda was chosen as centre for study.

1.3 RESEARCH QUESTIONS

The broad research questions that are studied in the thesis are :

- [1] What is the current status of the dyes and dyes intermediates industry ?**
- [2] What is the structure of this industry ?**
- [3] How the different groups of firms in the industry operate ?**
- [4] What is the impact of changes in various policies of the government on the industry ?**

1.4 PLAN OF THE THESIS

The thesis is organised in following manner :

Chapter 2 gives an overview of the dyes and dyes intermediates industry. It also gives the world scenario and the Indian scenario of the industry.

Chapter 3 gives the framework for the industry analysis.

Chapter 4 describes the design of the study. It describes the research methodology for the study.

Chapter 5 contains the analysis of the industry. It gives entry barriers to the industry, bargaining power of suppliers, bargaining power of buyers and operation of different groups of firms.

Chapter 6 explains the effects of various government policies on the industry.

Chapter 7 gives the conclusions, limitation and future scope of the study.

CHAPTER 2

DYES & DYES INTERMEDIATES INDUSTRY

2.1 INTRODUCTION

Dyes are essentially coloured substances capable of imputing their characteristic colours, fast to light, water, soap etc. to the fibres. A dye may be defined as a coloured substance which when applied to the fabrics imparts a permanent colour and the colour is not removed by washing with water, soap or an exposure to sunlight. All coloured substances are not necessarily dyes. For example though both Picric acid and Trinitrotoluene have yellow colour but only Picric acid can fix to a cloth and is a dye, where as Trinitrotoluene does not fix to a cloth and hence is not a dye.

In old days when there was no industry on synthetic dyes, the fibres were generally dyed by colouring matters obtained from plants and animals. Until the middle of nineteenth century, dyes were obtained from vegetables or in case of Cochineal from insects. The following table lists some such sources :

Table 2.1

Sources of Dyes Before Discovery of Synthetic Dyes

Dye (colour)	Source
Saffron (yellow)	Dried flowers of colour thistle
Indigo (blue)	Indigo leaves
Madder or Turkey red or Alizarin	Roots of madder plant
Cochineal (red)	Female insect <i>Coccusacti</i>
Tyrian Purple (red)	Snail <i>Murex Brandarin</i>

Source : A textbook of Synthetic Dyes, 1990

At present, practically all dyes are synthetic products made by organic processes. The revolution began in 1856 when W.H. Perkin, at the age of eighteen, discovered dye, aniline purple, in the course of research which was an attempt to synthesize the drug quinine. The relation between dyes and drugs may appear to be superfluous but chemically they are often very similar and are often manufactured by the same factory.

Today thousands of synthetic dyes are available, but the search for better ones continues and each new fibre which appears presents new problems for the dyer. Progress is most rapid when a completely new kind of molecule is discovered from which many different coloured dyes can be prepared. A good example of this was the discovery by the chemists of Imperial Chemical Industries (ICI) of the phthalocyanines (Tyagi & Yadav, 1990), compounds related to the red colouring matter of blood and the green colour of plants. A long series of researches resulted in the large scale manufacture of a whole new series of dyes based on molecules of this kind. This research, originally carried out with the object of finding out new dyes, also opened up an important new field of pure organic chemistry.

2.2 DISCOVERIES IN THE INDUSTRY

As already mentioned, the revolution in the manufacturing of dyes started in 1856 when W.H. Perkin, discovered dye, aniline purple, in the course of research which was an attempt to synthesize the drug quinine, an anti malarial drug.

Verguin, in 1859, discovered Magenta while he was studying the reaction between crude aniline and Tin (iv) chloride (Abahart, 1968). In this way Verguin discovered a new class of dyes, the triphenylmethanes. Another important class of dyes, discovered in 1863, was the aniline blacks.

The most important reaction carried out in the synthetic dyes industry is the diazotation discovered by Peter Griess at Royal College, London. About half of the dyes

in use at present are obtained by diazotation and are known as azo dyes. The first commercially successful azo dye, Bismark Brown, was discovered by Martius in 1863.

The solution of structure of benzene by Kekule made an enormous impact on both organic chemistry and the dyes industry. This newly acquired information was put to use in synthesis of two natural dyes, Alizarin & Indigo. Commercially viable method for preparing Indigo was discovered by K. Heumann in 1897. It involves the conversion of naphthalene to phthalic anhydride, anthranilic acid, indoxyl and then indigo. Despite its long reaction sequence, synthetic indigo was cheaper and of superior quality to natural indigo. The natural indigo had impurities which resulted in its colour on fabric differing from that of the synthetic material but the advantages of using a relatively pure dye having predictable and reproducible shade made the use of synthetic indigo very popular.

Some dyes having no natural counter parts were also developed. New classes of dyes discovered included x-anthenas, phenothiazines, sulphur dyes, etc.

Von Baeyer discovered the first x-anthene dye. He obtained it when he condensed resorcinol and phthalic anhydride to give Fluorescein. Caro brominated Fluorecein and obtained another useful dye, Eosine. Rose Bengal, which is still used as a photosensitiser, also belongs to this class.

The first sulphur dye was discovered in 1873 by Croissant and Bretonniere. The most important sulphur dye used today is Sulphur Black.

The first azo dye for wool, Chrysoidine, was discovered in 1875 by Caro and it is still used.

Many new classes of dyes have been introduced in the second half of the nineteenth century. Only a few new chromogens have been added to the available dyes since then. A high level of research has been maintained but the emphasis has been on optimisation and improvement of the available chromogens, rather than on the discovery of new types (Griffiths, 1984).

The major challenge to the dyes manufacturers came with introduction of man-made fibres such as nylon, polyester and polyacronitrile. Soon the acid dyes were discovered for nylon; neutral, low molecular weight dyes that is disperse dyes were found suitable for polyester. Basic dyes were found suitable for polyacronitrile. All these were merely modifications of the dyes which were already available.

Because of close relationship between the advancement of organic chemistry and dyes industry we find that major dyes companies have successful pharmaceutical (eg. Hoechst, Sandoz, etc.), agrochemical (eg. BASF, Bayer, etc.) and other organic chemistry intensive divisions.

Thus, the discoveries in the dyes industry has played an important role in the modern organic chemical industry.

2.3 DYE INTERMEDIATES

The raw materials for the manufacture of dyes are benzene, naphthalene, anthracene etc., which are obtained from coal-tar and petroleum by fractional distillation. These raw materials are known as primaries. Manufacturing of dyes requires various unit processes like sulphonation, nitration, helogenation, reduction, oxidation, etc. Hence majority of dyes are obtained from intermediates which have been previously synthesized. These dyes intermediates are manufactured from the basic raw materials by one of the unit processes. Then, they are processed to get the final product that is dyes. The list of the intermediates is very long. Some of such intermediates are H-acid, J-acid, vinyl sulphone, benzanthrone, magenta, etc.

2.4 CLASSIFICATION OF DYES

Dyes may be classified either by their end use or by their chemical structure. The classification by their end use is more popular in the dyes industry and is followed. This is as given below :

Table 2.2
Classification of Dyes by End Use

Types of Dyes	Group Attached	Example
Acid dyes	Sulphonic acid or phenolic group	Picric acid, Orange II, etc.
Basic dyes	Hydrochloride / zinc chloride complex of colour bases	Methyl violet, Crystal violet, etc.
Direct dyes	Azo	Congo Red, etc.
Reactive dyes	Hydroxyl or amino group	Orange azo, etc.
Vat dyes	Polycondesed aromatic carboxyl group	Benzanthrone dyes, etc.
Sulphur dyes	Sulphur containing carboxyl group	Sulphur Black, etc.
Organic pigments	Phthalocyanine group	Phthalocyanine blue, etc.
Mordant dyes	Metallic salts with azo or anthoquinone group	Alizarin, etc.
Disperse dyes	Azo, anthraquinone group	Inoamine, etc.
Ingrain dyes	Azo group	Para Red, etc.

Source : A textbook of Synthetic Dyes, 1990

The process for attaching dye to fibres & yarns is different for different group. The detailed classification and its process is given in Appendix 1. The application of these dyes are wide ranging. Direct dyes are used for dyeing cotton, viscose and other cellulosic material. Acid dyes are used for dyeing wool, nylon, pure silk and other protein fibres. Mordant dyes are used for dyeing vegetables and animal fibres. Basic dyes are used for dyeing jute, paper, coir, sheepskin, and furs. Pigments are used for paints and printing

inks. Vat dyes are used along with reactive dyes, naphthols and sulphur dyes for dyeing cotton & viscose textiles. Vat dyes also find application in the dyeing of paper pulp for high quality paper. Disperse dyes are used to dye polyesters and nylon, while optical brightening agents are used to impart brightness to cotton textiles.

This covers almost all the major classes of dyes which are classified according to their end use. The total number of dyes of different colours in vogue in various use-wise classes is given in the table below :

Table 2.3

Number of Dyes of Different Colours in Vogue in Various Use-wise Classes

Dye class	Number of dyes								
	Yellow	Orange	Red	Violet	Blue	Green	Brown	Black	Total
Acid	118	79	171	39	144	49	195	88	883
Basic	56	23	47	26	77	4	9	3	245
Direct	73	36	78	23	105	25	43	61	444
Disperse	100	67	156	44	158	3	11	10	549
Food	9	5	17	1	7	4	2	3	48
Mordant	16	10	19	10	17	8	19	21	120
Natural	3	1	7	-	-	2	2	-	15
Pigment	115	37	154	25	42	21	16	19	429
Reactive	113	77	161	27	149	10	30	14	581
Sulphur	17	5	12	-	29	29	58	14	164
Vat	18	16	20	12	38	19	27	31	181
Solvent	89	44	101	23	57	11	23	25	373
Azoic	4	3	12	2	7	1	8	6	43
Total	731	403	955	232	830	186	443	295	4075

Source : Chemical Weekly, March 28, 1995

From the above table it can be seen that there are hundreds of dyes in each colour and in almost every class. This only gives the dyes which are currently being used but the total number of dyes introduced upto now is 9874. This shows the vastness of the product range. One of the reasons for product range to be so large is that different dye attaches to different fibres and yarns. The other reason being that it represents different shades of colours produced by attaching different group to the basic chromogen.

One important thing to be noticed is that this industry is a heavily polluting industry. There are many dyes manufacturing processes, whose waste is hazardous to health (Shenai, 1995). Therefore proper measures have to be taken to control the pollution in permissible limit by installing pollution control equipment & effluent treatment plants.

2.5 WORLD SCENARIO

As explained above, discoveries in the synthetic dyestuff industry were mainly in European countries. Therefore this industry took shape in these countries only. The early years saw the growth and development of the industry in Western Europe. The second stage was the period of development of the industry in the United States, where some of the largest production capacities were established by the end of Second world war. From the nineteen thirties to the seventies, the global industry passed through a phase of development growth and stability until this was interrupted by the first oil shock in the 1970s.

The early 1980s saw the industry facing hard times when capacity was in excess of demand in the developed countries. As a result, prices started plummeting and the industry went through a period of re-structuring in which capacity was drastically cut. From 1986, the situation improved with general economic expansion in the West. But the beginning of the 1990s saw a reverse trend with demand once again on the downside. At the same time increase in capacity which was sanctioned in the 1986-88 period led to a drop in prices and consequently lower profits (Parimi, 1994).

Once again, major dyes manufacturers are restructuring their business and future of the global dyes & dyes intermediate industry could well be settled in the markets of the far east. This is discussed in detail in this section.

The global dyestuff output, including pigments and intermediates, was valued at around \$ 20 billion in 1994 and is likely to increase to \$ 23 billion by 1995. Europe, USA and Japan are currently the leading producers with around 60 percent share of the world market while the remaining 40 percent is shared by the other countries.

But, by the turn of the century, this scenario, is likely to alter drastically with China, South Korea, Taiwan and India together trying to capture more than 50 percent of the world dyestuff market (MEDC, 1995). The main reason for the dyestuff industry shifting to the east is the environment pressure group in the west and the subsequent stringent implementation of anti-pollution laws with high costs of effluent treatment plants. Moreover, restriction of production of certain dyes and intermediates in the west has resulted in them sourcing new manufacturing bases in the east. In addition, the attraction for foreign firms shifting to the east is the low production costs, cheap and trained labour and relatively inexpensive raw-materials which form nearly 60 percent of production costs.

In the process, production is being transferred from the developed countries to the developing countries such as Korea, Taiwan, China, India, Indonesia, etc. Many large companies from the west are planning large investments in research and manufacturing in far east during 1990s. While European manufacturers, at present, dominate the world market, there is lot of rationalisation of production, consequently creating a vacuum for most types of dyestuffs. These manufacturers are planning to concentrate more on specialised product areas such as paints, agrochemicals, pharmaceuticals and high-value plastics. As a result, relatively new-comers such as China, South Korea, Taiwan and Indonesia have become aggressive global players. India, too, is in an advantageous position as global demand continues to increase while production levels in the west keep

falling. The advantage with India is that the dyes and dyes industry in India has completed 45 years. Thus the firms in the industry have good experience in the manufacturing and the availability of skilled personal is an added advantage. Also the source for the hydrocarbons, which are imported by most of the countries form the middle east, is nearer to India than other developing countries which results in low cost of hydrocarbons as the transportation cost is low. Table below show the world production of dyes :

Table 2.4
World Production of Dyes

(in tonnes)					
Country	1987	1988	1989	1990	1991
North America	5200	5200	5300	5300	5400
South America	12300	13800	14900	9500	10900
Asia	182000	190300	198800	204700	201100
EEC	779600	783500	793200	782000	785900
EFTA	1000	1400	2200	2300	2400
East Europe	59900	61600	60500	43700	34900
Rest of Europe	-----	-----	-----	-----	2100
Former USSR	78700	82100	81300	83900	-----
Total	1118700	1137800	1156200	1077400	1042700

Source : MEDC monthly economic digest, Jan. 1995.

The former Soviet Union has disintegrated resulting in decline in production. In USA, production has become insignificant due to closing down of major players. No growth has been witnessed in west Europe either. While Italy has completely stopped production, the same in Japan has more or less peaked and remains stable at around 60,000 to 65,000 tonnes.

In 1976, there were 21 large scale dyestuff manufacturers in the US while at present, there are only 10 major manufacturers. During the last decade, major American

dyestuff companies such as Allied Corporation, Tenneco, American Cynamid, Du Pont stopped the manufacture of dyes. At present, dominant European manufacturers such as Crompton Knowles and Atlantis Chemicals operates in the \$ 800 million American dye market.

Nearly 60 per cent of the world annual output of 1.2 million tones is now controlled by eight to ten giant companies which include Hoechst, BASF and Bayer of Germany, Sandoz and Ciba Geigy of Switzerland, American Colour and Atlantis Chemicals of USA. In year 1993-94, India had around 4 % of the world market as her share. Table below shows world market share of different countries :

Table 2.5
World Market Share of Different Countries

Country	Market share (%)
Germany	22
Russia	13
Japan	9
Switzerland	8
Britain	8
France	5
India	4
Others	31

Source : Chemical Weekly, June 7, 1994

Germany had 32.5 % of the world market and Switzerland had 25.3 % of the world market in the year 1985. From the above table that share of both the countries has

dropped sharply, which indicates the decline in the production of the dyestuff in these countries.

2.6 INDIAN SCENARIO

The process of dyeing, printing & painting of cotton textiles is known in India from few centuries. In the past when synthetic dyes were not there the colour was obtained from the natural dyes which were made from plants, vegetables and flowers. The main plants, vegetables & flowers used were 'Cheyroot' and 'Sarangi' roots for red colour, 'Indigo' for blue colour, 'Turmeric' and 'Kusum' for yellow colour and many shades were obtained by using materials like fermented starch, pomegranate rind, mango bark etc. The chemical technology in respect of the use of vegetable dyes in conjunction with other mineral and plant products was very highly developed in India. These processes were known and had been perfected since antiquity and India was the undoubted leader in the world in this field till 18th century. It was only after the discovery of synthetic dyes and the successful synthesis of artificial alizarin and indigo in the late 19th century that traditional dyeing techniques came to be replaced by chemical dyes. This forced the Indians to manufacture the chemical dyes to compete with the western firms (Kanakalatha, 1992).

The manufacture of dyes & dyes intermediates got off to a very late start in India in spite of the existence of a flourishing textile industry. Stiff foreign competition, the absence of official encouragement and the partial dependence on imported raw materials were some of the factors causing lack of activity in this field. A beginning however was made in 1940 by the Associated Research laboratories and later a number of firms followed suit. By 1951, about Rs. 25 lakh had been invested in this field of manufacturing and six different units were engaged in the manufacture of stabilised azoics and developing salts in quantities sufficient to meet the bulk of the indigenous demand, placed at about 1300 ton a year and valued at Rs. 40 lakh.

In the first plan, dyes and dyes intermediates industry was still in the preliminary stages of development. There were new firms coming up with the collaboration of foreign manufacturers for technical assistance in this field. But the progress was hampered due to liberal import policy, high competition from foreign exporters, and a high duty of 37 % ad valorem on important raw materials which were imported. But the policy was changed in 1955 with introduction of import duty on imported dyestuffs and reducing the import duty on raw materials to 10 % ad valorem (Desusa, 1961).

In the first half of the 1950s, the industry was substantially dependent on imports for its supplies of synthetic organic dyes. Imports from all sources had risen to about 7,000 tons by 1954-55. However, with the growth of the Indian dyes & its intermediates industry and with India's shortage of foreign exchange, restriction on imports were tightened in subsequent years. In 1958-59 imports from all sources were only about half of 1954-55 level. The Indian government's third five year plan included a 1965-66 target for the further expansion of dyes manufacturing capacity and the foreign manufacturers saw this as an opportunity to invest in India to manufacture dyes in India so as to capture the Indian market. Also they expected no relaxation in import policy of Indian government. Therefore, companies like ICI of UK set up a plant in collaboration with Atul products Ltd., an Indian manufacturing firm. This new firm, Atic industries, was to manufacture Procions & Alcions range of reactive dyes which were developed by the ICI in late 50s (Sudworth, 1971) .

Also the availability of raw material improved from the second plan onwards due to manufacturing of petrochemicals. These new products were manufactured by the coal-tar distillation units which started working in second plan and grew in subsequent years. With the setting up of the naphtha crackers and refineries like Union Carbide in 1966, having capacity of 20,000 tons annually at Trombay, NOCIL in 1968, having capacity of 60,000 tons yearly near Bombay and IPCL in 70s, with capacity of 1.3 lakh tons annually at Baroda enhanced the manufacturing of dyes and dyes intermediates in India. The units

manufacturing dyes and dyes intermediate were concentrated in the states of Maharashtra & Gujarat because of the availability of raw materials in these states and also the buyers of the dyes were concentrated in these states.

Dyes & its intermediates in India were manufactured by both organised and small scale sectors. The total number of units in 1984 was 907, as against 150 in 1975. The total production of finished dyestuffs in 1984 amounted to 28,000 ton valued at Rs. 280 crores as against 18,500 ton valued at Rs. 150 crores in 1975. The installed capacity was 33, 633 tones in 1984 as against 21,600 ton in 1975. The production and the installed capacity of the organised sector from 1970 to 1982 is as shown in following table :

Table 2.6
Installed Capacity & Production of Dyes by Organised Sector
('000 tonnes)

Year	Installed Capacity	Production	% Capacity Utilisation
1975	21.6	13.7	63.4
1976	23.3	17.8	76.4
1977	24.5	18.1	78.9
1978	25.0	19.8	79.2
1979	27.5	20.2	73.5
1980	28.4	19.3	68.0
1981	29.6	18.6	62.8
1982	30.6	17.6	57.5
1983	30.6	18.5	60.4
1984	33.6	18.1	53.8
1985	33.6	19.4	57.7
1986	33.6	18.7	55.6
1987	34	20.5	60.2
1988	34	22	64.7
1989	36.7	24	65.4
1990	36.7	24.2	65.9
1991	37.3	25.4	68.0
1992	37.8	25.5	67.4
1993	38.9	25.7	66.0
1994	38.9	26.9*	69.0
1995	38.9	28.6**	73.5

Sources : Kothari's Industrial Directory of India 1988-89,
Chemical weekly annual number 1987 to 1992
Ministry report, 1994
* Anticipated, ** Estimated

The industries' woes during 1978-79 to 1985-86 can be attributed mainly to three factors (Kothari, 1989-90). Firstly, the massive excise benefits announced on the small scale units in 1978-79 and 1980-81 budgets, resulted in the mushroom growth of small units from just around 350 to 875 units. Secondly, the dyestuffs industry in India came up

mainly for the large sized textile sector. Over 85 % of the dyestuffs production in the country was consumed by the large-size textile sector. The 18 month long strike in Bombay Mills gave a tremendous boost to small-sized, powerloom as well as cloth-processing units which subsequently emerged as tough competitors to the organised sector textile mills. These small sized processing houses evidently preferred to buy dyes and pigments from small scale dyes manufacturing units due to low prices quoted by them. Thus, a sizable segment of the capacity of the large dye companies remained unutilised. The excise concessions for small scale firms are given in Appendix 2. The third reason being the relaxation in the import policy by the government. But the things improved as there was a change in the import policy in the year 1986 and also the exports of the industry had increased from Rs. 1.53 crores in 1969-70 to Rs. 47 crores in 1984-85. Thus the prospects of the industry were bright.

Uptil late 80's the exports were meant to be a sheet-anchor for the dyes & dyes intermediates industry. The domestic textile industry was sloppy at that time and companies resorted to export just to offset sluggish sales. The trend in export is as given in appendix 3. Table blow shows the export by groupwise i.e. dyes & dyes intermediates :

Table 2.7

Export by Items

(Rs. in million)

Items	90-91	%	91-92	%	92-93	%	93-94	%
Dyes	3187	70.7	5352	68.9	7109	71.4	8829	78.2
Dyes intermediates	1322	29.3	2419	31.1	2817	28.6	2455	21.8
Total	4509	100	7771	100	9836	100	11283	100

Source : Chemexil

It is interesting to note that the exports of dyes over the years has increased tremendously while the exports of dyes intermediates has remained almost at the same level in last three years. This indicates that the sourcing of dyes in international market has increased. Uptil, now the international buyers were importing mainly crude dyes as the starting stages of production of many dyes were banned. They were refining these crude dyes to get the final product. But now the scenario is changing and the demand for finished dyes is increasing. The main items which were exported are reactive dyes, organic pigments, vat dyes, H-acid, acid dyes, direct dyes, vinyl sulphone, gamma acid, etc. The main countries to which exports was done are West Europe (Germany, UK, Italy, Netherlands, Switzerland, France, etc.), South Asia (Bangladesh, Sri Lanka, etc.), East Asia (Australia, Hong Kong, Indonesia, Japan, Singapore, Thailand, etc.), North America (USA, Canada, etc.).

At present there are around 950 firms which are manufacturing dyes & dyes intermediates, out of which 48 are in organised sector and others are in unorganised sector. The unorganised sector contributes to around 50 % to 55 % of the total production of the dyestuffs. The share of these firms in the export is around 45 %. The major producers of dyes and dyes intermediates in India are Indian Dyestuffs Industries, Atul products Ltd., Atic industries, Mardia Chemicals Ltd., Serene dyestuffs Ltd., Colour-chem Ltd. etc. The total sales of the organised sector in the year 1993-94 was around Rs. 1600 crores. The market share of these leading firms for the year 1993-94 is as given below :

Table 2.8
Market Share of Different Firms

Firm	Market Share (%)
Indian Dyestuffs Ind. Ltd.	17.6
Atic Industries Ltd.	9.1
Jaysynth Dyechem Ltd.	7.5
Atul Products Ltd.	7.4
Mardia Chemicals Ltd.	7.2
Sudarshan Chemical Ind. Ltd.	6.7
Colour-chem Ltd.	6.3
Metrochem Industries Ltd.	4.4
Sandoz (I) Ltd.	4.0
Others	29.8

Source : CMIE, Feb. 1995

Due to changes in the government policy as a part of ongoing economic reforms from the year 1991 onwards, the prospects of textile industry have brightened. The other consuming industries like paints and leather are reported to be doing well, raising hopes of good domestic demand for the various dyestuffs in the coming years. Also, per capita consumption of dyestuffs in India is only 50 grams as compared to the world average of 250 grams per year. This figure is expected to grow considerably in the coming years, increasing further the domestic demand for the dyestuffs. Also continuous increase in the export and the shifting of the manufacturing base of the western manufacturers to the developing countries represents a good opportunity for the Indian dyestuff manufacturers to increase their share in the world market.

CHAPTER 3

FRAMEWORK FOR INDUSTRY ANALYSIS

3.1 INTRODUCTION

Identification of various forces influencing the competitive advantage and the strategies of the firms of the industry is the first and most important step in study of the industry. The literature survey provides a theoretical insight and framework for the same. Significant works have been done in this area by many well known authors of which the work done by Porter (1980) was found more relevant for this study.

3.2 FORCES GOVERNING THE INDUSTRY

In his work on techniques for analyzing industries and competitors, Porter (1980) has identified five forces which govern the competition in the industry. These forces are :

3.2.1. Threat of Entry :

New entrants to an industry bring new capacity, the desire to gain market share, and often substantial resources. This can result in down bidding of prices which reduces profitability. Companies diversifying through acquisition into the industry should probably be viewed as entry even though no entirely new entry is created.

The threat of entry into an industry depends on the barriers to entry that are present, coupled with the reaction from existing competitors that the entrant can expect.

The major sources of barriers to entry are :

Economies of Scale

Economies of scale refer to declines in unit costs of a product as the absolute volume per period increases. Economies of scale deter entry by forcing the entrant to come in at large scale and risk strong reaction from the existing firms or come in at a small scale and accept a cost disadvantage, both undesirable options. Scale economies can be present in nearly every function of a business, including manufacturing, purchasing, research and development, marketing, service network, sales force utilisation and distribution.

A type of economies of scale entry barrier occurs when there are economies to vertical integration, that is, operating in successive stages of production or distribution. Here the entrant must enter integrated or face a cost disadvantage, as well as possible foreclosure of inputs or markets for its product if most established competitors are integrated. Foreclosure in such situations stem from the fact that most customers purchase from in-house units, or most suppliers "sell" their inputs in-house. The independent firm faces a difficult time in getting comparable prices and may become "squeezed" if integrated competitors offer different terms to it than to their captive units.

Product Differentiation

Product differentiation means that established firms have brand identification and customer loyalties, which stem from past advertising, customer service, product differences, or simply being first into the industry. Differentiation creates a barrier to entry by forcing entrants to spend heavily to overcome existing customer loyalties.

Capital Requirements

A barrier to entry is created by the need to invest large financial resources in order to compete, particularly if the capital is required for risky or uncoverable up-front advertising or R & D. Capital may be necessary not only for production facilities but also

for things like customer credit, inventories, or covering start-up losses. Even if capital is available on the capital markets, entry represents a risky use of that capital which is reflected in risk premium charged to the prospective entrant, these constitute advantages for going firms.

Switching Costs

A barrier to entry is created by the presence of switching costs, that is, one-time costs facing the buyer of switching costs may include employee retraining costs, cost of new ancillary equipment, cost and time in testing or qualifying a new source, need for technical help as a result of reliance on seller engineering aid, product redesign, or even psychic costs of severing a relationship. If these switching costs are high, then new entrants must offer a major improvement in cost or performance in order for the buyer to switch from an incumbent.

Access to Distribution Channels

A barrier to entry can be created by the new entrants' need to secure distribution for its product. To the extent that logical distribution channels for the product have already been served by established firms, the new firm must persuade the channels to accept its product through price breaks, co-operative advertising allowances, and the like, which reduces profits. The more limited the wholesale or retail channels for a product are and the more existing competitors have these tied up, obviously the tougher entry into the industry will be. Existing competitors may have ties with channels based on long relationships, high quality service, or even exclusive relationships in which the channel is solely identified with a particular manufacturer.

Government Policy

The last major source of entry barrier is government policy. Government can limit or even foreclose entry into industries with such controls like licensing requirements and limits on access to raw materials. More subtle government restrictions on entry can stem from controls such as air and water pollution standards and product safety. For example, pollution control requirements can increase the capital needed for entry and the required technological sophistication and even the optimal scale of facilities. Standards for product testing can impose substantial lead times, which not only raise the capital cost of entry but also give established firms ample notice of impending entry and sometimes full knowledge of the new competitors' product with which to formulate retaliatory strategies. Government policy in such areas certainly has direct social benefits, but it often has secondary consequences for entry which are unrecognized.

3.2.2 Intensity of Rivalry Among Existing Competitors

Rivalry among existing competitors takes the familiar form of racing for position - using tactics like price competition, advertising battles, product introductions, and increased customer service or warranties. Rivalry occurs because one or more firms wither feels the pressure or sees the opportunity to improve position. In most industries, competitive move by one firm have noticeable effects on its competitors and thus may initiate retaliation or efforts to counter the move; that is, firms are mutually dependent. This pattern of action and reaction many or many not leave the initiating firm and the industry as whole better off. If moves and countermoves escalate, then all firms in the industry may suffer and be worse off than before. Intense rivalry is the result of a number of interacting structural factors. Some of these factors are :

Numerous or Equally Balanced Competitors

When firms are numerous, the likelihood of mavericks is great and some firms may habitually believe they can make moves without being noticed. Even where there are relatively few firms, if they are relatively balanced in terms of size and perceived resources, it creates instability because they may be prone to fight each other and have the resources for sustained and vigorous retaliation. When the industry is highly concentrated or dominated by one of a few firms, on the other hand, then there is little mistaking relative strength, and the leader or leaders can impose discipline as well as play a coordinative role in the industry through devices like price leadership.

Slow Industry Growth

Slow industry growth turns competition into a market share game for firms seeking expansion. Market share competition is a great deal more volatile than is the situation in which rapid industry growth insures that firms can improve results just by keeping up with the industry, and where all their financial and managerial resources may be consumed by expanding with the industry.

Lack of Differentiation or Switching Costs

Where the product or service is perceived as a commodity or near commodity, choice by the buyers is largely based on price and service, and pressures for intense price and service competition result. These forms of competition are particularly volatile, as has been discussed. Product differentiation, on the other hand, creates layers of insulation against competitive warfare because buyers have preferences and loyalties to particular sellers. Switching costs, described earlier, have the same effect.

3.2.3 Bargaining Power of Buyers

Buyers compete with the industry by forcing down prices, bargaining for higher quality or more services, and playing competitors against each other - all at the expense of industry profitability. The power of each of the industry's important buyer groups depends on a number of characteristics of its market situation and on the relative importance of its purchases from the industry compared with its overall business. A buyer group is powerful in following circumstances :

[1] It is concentrated or purchases large volumes relative to seller sales.

If a large portion of sales is purchased by a given buyer this raises the importance of the buyer's business in results. Large volume buyers are particularly potent forces if heavy fixed costs characterize the industry and raise the stakes to keep capacity filled.

[2] The product it purchases from the industry represents a significant fraction of the buyers' costs or purchases.

Here buyers are prone to expend the resources necessary to shop for a favorable price and purchase selectively. When the product sold by the industry in question is a small fraction of buyers' costs, buyers are usually much less price sensitive.

[3] The products it purchases from the industry are standard or undifferentiated.

Buyers, sure that they can always find alternative suppliers, may play one company against another.

[4] It faces few switching costs.

Switching costs, explained earlier, lock the buyer to particular sellers.

[5] Buyers pose a creditable threat of backward integration :

If buyers either are partially integrated or pose a creditable threat of backward integration, they are in a position to demand bargaining concessions. Buyers power can be partially neutralized when firms in the industry offer a threat of forward integration into the buyers' industry.

[6] The industry's product is unimportant to the quality of the buyer's products or services.

When the quality of the buyer's products is very much affected by the industry's product, buyers are generally less price sensitive.

[7] The buyer has full information.

Where the buyer has full information about demand, actual market prices, and even supplies costs, this usually yields the buyer greater bargaining leverage than when information is poor. With full information, the buyer is in a greater position to insure that it receives the most favorable prices offered to others and can counter supplier's claims that their viability is threatened.

3.2.4 Bargaining Power of Suppliers

Suppliers can exert bargaining power over participants in an industry by purchased goods and services. Powerful suppliers can thereby squeeze profitability out of an industry unable to recover cost increases in its own prices.

The conditions making suppliers powerful tend to be exactly opposite to those making buyers powerful. A supplier group is powerful if the following apply :

[1] It is dominated by a few companies and is more concentrated than the industry it sells to.

Suppliers selling to more fragmented buyers will usually be able to exert considerable influence in prices, quality, and terms.

[2] It is not obliged to contend with other substitute products for sale to the industry.

The power of even large, powerful supplier can be checked if they compete with substitutes.

[3] The industry is not an important customer of the supplier group.

When suppliers sell to a number of industries and a particular industry does not represent a significant fraction of sales, suppliers are much more prone to exert power. If the industry is an important customer, supplier's fortunes will be closely tied to the

industry and they will want to protect it through reasonable pricing and assistance in activities like R & D and lobbying.

[4] The suppliers' product is an important input to the buyer's business.

Such an input is important to the success of the buyers' manufacturing process or product quality. This raises supplier power. This is particularly true where the input is not storable, thus enabling the buyer to build up stocks of inventory.

[5] The supplier group's products are differentiated or it has built up switching costs.

Differentiation or switching costs facing the buyers cut off their options to play one supplier against another. If the supplier faces switching costs the effect is reverse.

[6] The supplier group poses a creditable threat of forward integration.

This provides a check against the industry's ability to improve the terms on which it purchases.

3.3 ROLE OF GOVERNMENT

Government has been discussed as an entry barrier earlier. But it has much more role to play in an industry apart from being an entry barrier. In many industries, government is a buyer or supplier and can influence industry competition by the policies it adopts. Government regulations can also set limits on the behaviour of firms as suppliers or buyers. Government can also affect the position of an industry with substitutes through regulations, subsidies, or other means. Government can also affect rivalry among competitors by influencing industry growth, the cost structure through regulations, and so on.

Government also has a predominant role in building infrastructural facilities for the industries and R & D project funding and hence the upgradation of the technology. Government also influences the demand conditions and by that it affects the competition in the industry. Also governments' trade policy affects the exports as well as imports. By boosting exports, it increases the demand of the products of particular industry

internationally. The import duty cuts by the government opens the domestic industry to face the international competitors, thereby increasing the competition.

Thus no structural analysis is complete without a diagnosis of how present and future government policy, at all levels, will affect structural conditions.

3.4 STRATEGIC GROUPS

The first step in structural analysis within industries is to characterize the strategies of all significant competitors along these dimensions. This activity then allows for the mapping of the industry into strategic groups. A strategic group is the group of firms in an industry following the same or a similar strategy along the strategical dimensions. An industry could have only one strategic group if all the firms followed essentially the same strategy. At the other extreme, each firm could be a different strategic group. Usually, however, there are a small number of strategic groups which capture the essential strategic differences among the firms in the industry.

CHAPTER 4

DESIGN OF STUDY

4.1 INTRODUCTION

The chapter covers objective and scope of the study, followed by the frame work of the study.

4.2 OBJECTIVE

To study the dyes & dyes intermediates industry at Baroda and the impact of Government's liberalisation and pollution control policies on it.

As already explained in section 1.1, the government policies play an important role in shaping up of an industry. In India, since last four years there have been major changes in the government policies and these have affected the industry greatly. Hence, the impact of these changes on the industry was decided to be studied. Also the process of manufacturing dyes is considered to be one of the hazardous processes and hence it is greatly affected by the pollution control norms. Therefore the impact of the changes of pollution control was also decided to be included in the study.

4.3 SCOPE OF THE STUDY

The scope of the present study includes the dyes & dyes industry at Baroda. The dyes & dye intermediates industry in India has developed primarily in two states - Maharashtra and Gujarat. The main reason of development of the industry in these two states is due to the proximity to the raw materials which comes mainly from refineries; also the market for the industry i.e. textile manufacturers which consumes around 75 % to 80 % of the total production is also prominent in these two states. Baroda enjoys a special status as one of the centers producing the necessary raw materials required for the dyes &

dyes intermediates industry. These raw materials are provided by companies like Indian Petro Chemicals Ltd. (IPCL), Gujarat Alkalies & Chemicals Ltd. (GACL), Gujarat State Fertilizers Corp. (GSFC), Deepak Nitrite, etc. The raw material availability has attracted many firms to start their operations in Baroda. India's biggest dyestuffs manufacturer, Indian Dyestuffs Industries (IDI), has set up a plant in Baroda. Apart from this, there are around 90 small to medium scale firms who are engaged in producing dyes & dyes intermediates. They produce around 10% to 12 % of the country's total production of dyes & dyes intermediates. Baroda is also close to Surat and Ahemadabad which are among the main centers producing textiles. It also serves as a trade center for units in the neighbouring districts of Ankleshwar and Bharuch. Baroda has got an industrial estate of the Gujarat government which has all the facilities like power, water, required labour and facilities for them like medical hospital, school, etc., transportation and a common effluent treatment plant. This has attracted quite a large number of entrepreneurs to set up their units. Also a dry dock is being prepared at Baroda, which will further increase its importance.

The study covers the effect of government policies like pollution control policy, import/export policy, reservation policy for small scale, new small enterprise policy, changes in excise duty structure, etc.

4.4 FRAMEWORK OF THE STUDY

The literature survey revealed a number of important factors, which could greatly influence the performance of an industry. Keeping the objectives and scope of the study in view, the various stages of the study were planned.

4.4.1 Identification of Critical Factors

It was first necessary to identify all the critical factors which govern the competition in the industry & which could probably be influenced by the government policies. In the Chapter 3 various factors critical for the industry analysis have been described.

4.4.2 Generation of Research Questions

A detailed literature search helped in generation of number of research questions. Since there has not been any detailed study on dyes & dyes intermediate industry and particularly on the topic of this kind, it became mandatory to contact people concerned with the industry. A number of visits were made to units engaged in manufacturing dyes & dyes intermediates. The specific research questions generated were :

- **What is the present status of the industry ?**
 - industry growth
 - number of firms i.e. concentration
 - competition among the firms
- **What is the structure of the industry ?**
 - bargaining power of buyers
 - bargaining power of suppliers
 - entry barriers
- **What are the different strategic groups in the industry and how they operate ?**
 - small scale firms
 - medium scale firms
 - integrated firms
 - export oriented firms

- **What is the impact of changes in the government on the industry ?**

- industrial policy
- export-import policy
- excise duty
- pollution control

4.4.3 Research Method

Since the research questions generated were mainly of the form - " what ", trying to explore the effect of government policies on various industry related factors, a broad based and survey oriented research strategy was found to be the most appropriate. It was decided to collect necessary data by conducting a non schedule - structured interview (Nachmias & Nachmias, 1985).

4.4.4 Preparation of Questions for Interview :

To achieve above mentioned objectives, guidelines were prepared in the form of questions to be used for interview purpose (for details, see Appendix 4).

The first part of the survey tries to obtain information on the following variables which gives the profile of the respondents, competition in the industry, entry barriers of the industry, information about the suppliers and the buyers, etc.

- product range of the firm
- capacity utilisation
- financial performance of the firm
- investment done by the firm
- number of employees (skilled & unskilled)
- modernisation & expansion by the firm
- suppliers & buyers (concentration i.e. numbers)
- competitors and competition

- marketing strategy
- vertical integration
- exports and role of traders
- technical support available

The second part of the survey which aims at studying the impact of the government policies on various factors covers the policies like - industrial policy, export import policy, pollution control policy, excise duty structure, policies at state government level. This part also tries to measure the influence of government policies on infrastructure, human resources, licensing policy, finance availability, etc.

4.4.5 Identification of Strategic Groups and Selection of Firms

The dyes and dyes intermediate industry has been populated by a large number of small scale firms and a few medium scale firms. Hence size became one parameter in deciding the firms to be visited. Similarly, it is populated by firms varying in nature i.e. some have vertical integration to manufacture dyes from dyes intermediates and others are manufacturing dyes & dyes intermediates individually. Therefore it became the second parameter for selection of the firms. The third parameter chosen was the export orientation of the firms. Some firms in the industry are totally export oriented and others are operating mainly in domestic market. With the shift in sourcing of western firms to east, these firms can play a vital role in exports of the industry. Therefore this was taken as the third parameter for study. It was decided to visit 3 to 4 firms in each group i.e. small scale firms, medium scale firms, integrated firms and export oriented firms.

4.4.6 Data Collection & Analysis

First visit to Baroda was made to collect general information about the industry. After gathering this information, the number of suppliers, their nature and bargaining power was analysed. The detailed data about them was collected from secondary sources

like trade magazines, industrial directories, published surveys, etc. Similarly, the bargaining power of the buyers was analysed. This information also helped to determine the entry barriers into the industry.

Then a second visit to Baroda was made with the specific questions for the interviews. As operation of the small scale firms generally depends on their owners, it was decided to interview them. In the medium scale firms, it was decided to interview few key persons like managing director and production manager because the information on production facility and modernisation in them can be better explained by production manager, whereas managing director can give information regarding future plans, marketing, etc.

These persons were contacted by telephone to get an appointment through contact. Eight small scale firms were visited as these many owners were ready to give interview. The medium scale firms visited were three. There is only one firm in the Nandesari area which is integrated. Therefore only one integrated firm could be visited. There is no export oriented firm in Nandesari area. Hence, it was decided to visit a firm at Ankleshwar which is a 100 % EOU. There is no financial data available as most of the owners declined to give their financial performance. The data based on the survey was analysed for understanding the operation of the firms in different groups. Also, the competition among these firms was analysed. At the end of the study, conclusions were drawn.

CHAPTER 5

ANALYSIS OF INDUSTRY STRUCTURE

5.1 INTRODUCTION

In this chapter, first the bargaining power of suppliers is analysed. After this, the bargaining power of buyers is explained. It follows with the entry barriers applicable to this industry. Then the operations of different groups of firms is discussed. The last section in the chapter gives the analysis of the competition within the firms. .

5.2 SUPPLIER INDUSTRIES

The basic raw materials required by most of the dyestuff manufacturers are benzene, toluene, naphthalene & anthracene which are produced by coal tar industry & petroleum refineries. These are made by fractional distillation of coal tar or crude petroleum. The process of manufacturing of dyes requires various unit processes like sulphonation, nitration, reduction, helogenation etc. Hence various reactants like hydrochloric acid (HCl), sulphuric acid (H_2SO_4), aluminium chloride (AlCl_3), caustic soda (NaOH), soda ash (Na_2CO_3), & various other chemicals are required. The process diagram of the dyes and dyes intermediates industry is given in fig. 5.1.

5.2.1 Supplier Concentration

In India, the main supplier of the raw materials to the dyestuff manufacturers are petroleum refineries which include IPCL , MPCL, NOCIL, Cochin refineries etc. The number of refineries is very less as compared to the number of dyes and dyes intermediate manufacturers. These refineries, apart from NOCIL, are all public sector undertakings. Due to small number, these firms have almost a monopoly over the Indian market.

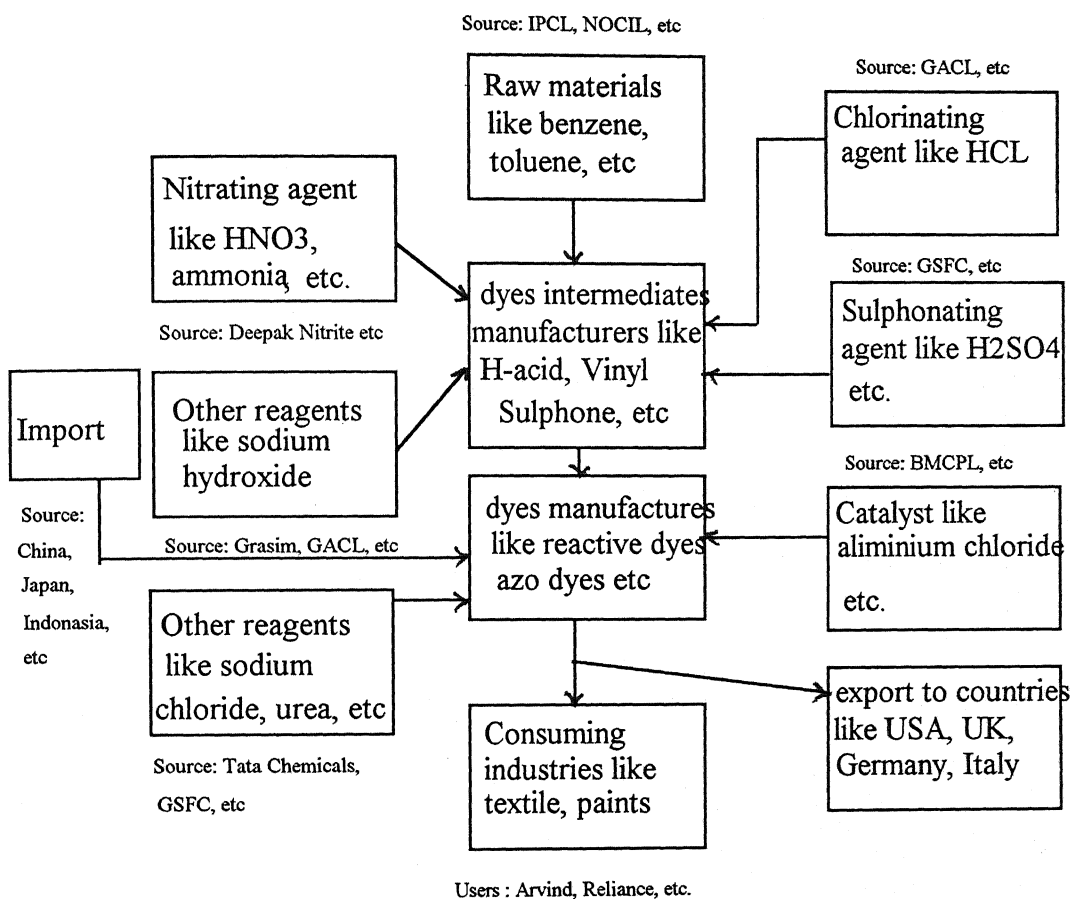


Fig. 5.1

Process Diagram of Dyes & Dyes Intermediates Industry

The suppliers of other raw materials are large in number. The manufacturers of caustic soda and soda ash are Tata Chemicals, Gujarat Alkalies & Chemicals Ltd., Grasim Industries Ltd., Punjab Alkalies Ltd., etc. Similarly manufacturers of other raw materials are many.

5.2.2 Importance of Volume to Suppliers

The raw materials consumed by the dyes and dyes intermediate industry represents a fraction of the total production of suppliers. The basic raw materials are consumed in industries like agrochemicals, pharmaceuticals, insecticides, etc. besides in dyes and dyes intermediates industry. The demand projections of basic feed stocks like benzene, toluene & xylenes are as given below :

Table 5.1
Demand Projections for Basic Feed stocks

(in tonnes)

Product	1989-90	1994-95	1999-2000
Benzene	353,000	578,000	858,000
Toluene	51,000	62,000	76,000
Xylenes	218,000	361,000	551,000

Source : Kapur Committee Report, April 1986

The demand for these basic feed stocks by dyes and dyes intermediates was projected as below :

Table 5.2

Demand of Basic Feed stocks by Dyes & Dyes Intermediates Industry

(in tonnes)

Product	1989-90	1994-95	1999-2000
Benzene	21,000	27,000	33,000
Toluene	9,000	11,500	14,000
Xylenes	4,000	5,120	6,250

Source : Prospective Plan for Chemical Industry Vol. 4

From table 5.1 & 5.2 it can be seen that demand by dyes and dyes intermediates industry represents a negligible amount of the total demand & at present the domestic production of these basic feed stocks is almost enough to supply the demand. Hence the volume by the dyes & dyes intermediates industry does not have much importance for the suppliers, that is the refineries.

5.2.3 Switching Costs of Suppliers and Firms in Industry

As the chemicals are not a product which can be differentiated from one supplier to another or from one buyer to another it does not represent any switching costs like labour retraining, process redesign, requirement of new machinery, etc. The only switching costs one can observe is of cost and time taken in testing of new source. But these costs are not significant as standard tests are available to test the material and these are inexpensive tests. Hence switching of suppliers does not involve any major costs as well as switching of buyers does not involve any major costs.

5.2.4 Presence of Substitutes Inputs

There is no substitute for the basic raw materials like benzene, toluene, naphthalene, etc. The chemicals required for various unit process like sulphonation, nitration, halogenation can be replaced by other chemicals. But they represent switching costs of redesigning the process controls, retraining of labour, testing of the process etc. which are quite high, and therefore restricts the manufacturers from switching to substitute inputs.

5.2.5 Threat of Forward Integration

The backward integration by the dyes & dyes intermediates manufacturers is impossible as it requires very large scale of operation, very different kind of technology and high capital investment. Also the forward integration by the suppliers is there but very limited because of very little consumption of the material produced by them in dyes & dyes intermediates manufacturing units individually as compared to their scale of operations. For example the biggest dyes & dyes intermediates firm, IDI, had a turn over of Rs. 328 crores in 93-94 whereas the Cochin Refinery has a turn over of Rs. 2038 crores and NOCIL has a turnover of Rs. 949 crores. Here one thing to be noticed is that IDI & NOCIL belong to same group i.e. Mafatlal group. Both the firms are there for quite a long time and have progressed simultaneously.

The other reason which restricts their entry is the pollution control required for the industry which requires a higher investment at low profitability. This point is discussed in more detail in chapter 6.

5.2.6 Impact of Inputs on Cost or Differentiation

Product quality of dyes & dyes intermediates depends on the material used and hence it is important to the firms in the industry to procure good quality raw material to ensure that the dyes produced are of good quality. Also the raw materials represent

around 50 % to 60 % of the total production costs. The cost structure of a typical firm in the industry is as given below. Therefore the costs of the firms are greatly affected by the raw material costs.

<u>Expenses (Rs. crores)</u>	<u>Percent of total expenses</u>
Raw Material - 156.40	60.9
Energy - 31.36	12.2
Wages - 41.99	16.3
Advt. Mktg. & Dist. - 5.18	2.0
other expenses - 21.83	8.5
Nonrecurring exp. - 0.03	neg.
Total expenses - 256.79	100

Thus from above discussion it is clear that the bargaining power of the basic raw material suppliers is very high. The traders role as the suppliers for the small scale firms is very important and is discussed in section 5.5.1.

5.3 BUYER INDUSTRIES

The significant buyers of dyes are textiles, paints, plastics, printing inks & leather industries. In India, 70 % to 75 % consumption of dyes is by textiles industry and the balance by other industrial sectors. The fortunes of the domestic dyestuff industry are thus closely linked with growth prospects of the textiles sector.

5.3.1 Buyer Concentration

As already mentioned, the consumer industries for dyes are textiles, paints, leather, printing inks, etc. The textiles industry is populated by large, medium as well as small scale firms. Therefore the buyers of the dyes in the textiles industry are numerous and differing in nature. The same is the case with paints as well as leather industries. But the supplier

that is the dyes industry follows the same pattern. Therefore, both buyers of dyes and dyes manufacturing firms have equal opportunity to change from one firm to another firm.

5.3.2 Price / Total Purchases

The price of the dyes represent a significant amount to small processing houses, small scale firms, local manufacturers of cloth i.e. weavers and so on. These compete on price with the medium scale and large scale firms and not on quality. Hence these manufacturers are price sensitive in comparison with the medium scale and the large scale manufacturers.

5.3.3 Product Differences

The dyes can only be differentiated on the basis of quality from one supplier to another. The manufacturers producing good quality of dyes are also large in numbers. Hence buyers always find another supplier supplying dyes with same quality and may play one supplier against another.

5.3.4 Switching Costs

The cloths like wool, silk and cotton may be dyed with acid dyes, basic dyes, vat dyes, etc. but the dyeing process changes with the change in the class of the dyes (appendix 1). Hence the manufacturers dyeing with acid dyes wants to switch to basic dyes, has to face switching costs of process redesign, retraining of labour, process testing, etc. Hence it restricts the manufacturers from shifting from one kind of dye class to another kind.

5.3.5 Backward Integration

Some of the textiles firms like Arvind (Atul), Mafatlal (IDI), etc. have integrated backward to manufacture dyes & dyes intermediate. Now other textile firms are also

thinking of backward integration. The firms in other industries like paints (Goodlass Nerolac) have integrated backward to manufacture pigments required by them. Hence there is significant amount of backward integration by the consuming industries. The forward integration by the dyes manufacturers in the consuming industry is almost nil as it requires very different kind of technology and high capital investment. Now the companies like Mardia Chemicals is planning to have manufacturing plants of yarns and fibers as a part of their diversification. One thing to be noticed is that all these are large scale to medium scale manufacturers. At small scale there is almost no integration either by consuming industries or by dyes manufacturers.

5.3.6 Importance of The Dyes to The Consuming Industries

The competition in the textile industry does not only depend on quality of cloth but also on design and patterns of the cloth. For different designs and patterns different colours are required and these colouring is done by dyes. Also the good quality cloth means having very good colour, its fastness to light, water and soap i.e. colour should resist all these things. Therefore, clothes with good patterns & design with excellent colour fastness are liked by the consumers. Therefore, the quality of dyes is very important to the textiles industry. The textiles industry has shown impressive growth in the export market and is the number one foreign exchange earner for the country at present. In 1994-95, the export touched Rs. 28,000 crores mark. In coming years this is expected to rise further which will increase the demand for good quality dyes. The textiles industry was not particular about quality in the past, but recently it has become quality conscious as the consumers of textiles are becoming particular about quality. This will also increase the demand for quality dyes. Similarly, dyes are important for other consuming industries.

From the above discussion, it can be said that the bargaining power of consuming industries vis-a-vis the dyes manufacturers is more because of the facts that there are

many dyes manufacturers & the buyers find it easy to switch the suppliers. Also the firms in the consuming industries has integrated backwards successfully which indicates that it is relatively easy to integrate backward which adds to the bargaining power of these industries.

5.4 ENTRY BARRIERS

The entry barriers which were found in this industry are explained below :

5.4.1 Economies of Scale

The economies of scale in manufacturing, purchasing, marketing and distribution are present in the industry. The economies of scale in manufacturing helps firms to have sophisticated instruments for process control. The existing large scale firms also have economies of vertical integration. Most of the firms in large scale for example, IDI, Atul, Colour-Chem, Mardia, Metrochem, etc. have integrated to manufacture dyes and dyes intermediates. Now Mardia Chemicals is also planning to manufacture yarns & fibres. IDI & Atul also have the advantages of in-house consumption of dyes, i.e., the group has textile units as part of their diversification. This type of integration forces units to come in large scale.

5.4.2 Product Differentiation

In the industry, some of the firms like IDI, Atul, etc. are from the beginning of the synthetic dyes industry in India. This has helped them to standardised the products. The firms coming later have to make the products with specification standardised by these firms. There has been brand identification in the industry. The brands are generally given by the medium scale and large scale firms like IDI, Atul, Khatau Zunkar, Neelikon Dyestuffs, Atic, Sandoz, etc. The small scale firms are finding difficulties in establishing the brand. One of the difficulties is that these firms are selling their products to traders

mostly and not directly to the consumers. These traders are not accepting the branding because they purchase from number of small scale firms and then supply in bulk to the buyers which restricts the branding as a lot may contain different quantity procured from different firms. The other reason is that these firms are not able to supply consistent quality of products which is very important to establish a brand.

Internationally there is branding by most of the firms like Hoechst, BASF, Sandoz, ICI, Huebach, etc. The branding by Indian firms internationally is almost not there as these firms were supplying crude dyes which were refined by the western manufacturers and then branded by them. But now the scenario is changing. Some of the firms like Serene Dyestuffs, IDI have established their division in countries like UK, Hong Kong, Thailand, etc. and are selling their product with their brand. Here the firms with joint collaboration or fully owned subsidiary have the advantage of parent company's brand.

Thus, there is brand identification present which will have to be broken if one has to manufacture that particular class of dyes.

5.4.3 Access to Distribution Channel

Firms like Khatau Zunkar, IDI, Atul, Serene have vast distribution network domestically. Some of the firms have started to establish their own marketing & distribution channel internationally. Some firms like Sudarshan Chemicals has a joint collaboration with international firm Dai Nippon to buy their product. Also firms like Colour-Chem, Sandoz, Huebach, etc. have got worldwide network of parent company to supply their product. So a new firm entering into the business must have access to wide distribution network to gain entry into the market.

5.4.4 Government Policy

Government has made the pollution control norms more stringent which has raised the need of a firm to come with large capacity to keep their production cost low. Also

governments' reservation policy for SSI and licensing policy restricts the entry into the industry. These policies are explained in the chapter 6.

5.5 STRATEGIC GROUPS IN THE INDUSTRY AND THEIR OPERATIONS

At present, there are total 950 units which are manufacturing dyes & dyes intermediates, out of which around 50 units are in organised sector while 900 units are in unorganised sector. In Baroda, there are around 90 units which are manufacturing dyes and dyes intermediates. Out of these 90 units, around 60 units are in Gujarat Industrial Development Corporation (GIDC) Estate at Nandesari and rest are scattered at Makarpura, Ranoli and Savli. The firms on their nature of operation can be classified as small scale firms, medium scale firms, integrated firms & export oriented firms. The working of these firms are explained below :

5.5.1 Small Scale Firms

The small scale firms are defined by government as the firms which are having investment on the plant and machinery of not more than Rs. 60 lakh.

Installed capacity & production of the firms

The installed capacity of these firms vary from 20 TPA to 360 TPA. The investment on plant and machinery from Rs. 10 lakh to Rs. 50 lakh. The production and installed capacity of the small scale firms for the year 1993-94 is as shown below :

Table 5.3**Installed Capacity & Production of Small Scale Firms at Nandesari**

Product	Installed capacity (tones)	No. of units	Production (tones)	% utilisation
Vinyl sulphone	1020	6	830	81.37
H-acid	800	4	577	72.12
Dyes	488	7	448	91.80
Other intermediates	200	5	142	71.00

Organisational Structure

Most of the firms are partnership firms or proprietary firms. In most of the firms administration, marketing and purchase is looked by the owners themselves. There are only 3 to 4 people employed by them to do the regular clerical work of accounts and other book keeping work like stocks, etc. At the production site, the production is looked after by the supervisors. In a particular unit the number of workers vary with the change in installed capacity. Generally a unit has 10 to 15 workers per shift in small scale units. The number of shift varies from one to three from unit to unit. Most of the workers have not completed their primary education but are working in the industry for a long time i.e. at least from last five years. The number of required workers are very less per unit than other industry because they are required only for feeding of the material, monitoring the process and packing of the material. Around 50 % of the workers are skilled workers and others are unskilled in 90 % of the units. The skilled workers are required for running the process as process parameters are not controlled by any kind of instrumentation and continuous monitoring has to be done by the workers only. The maximum number of supervisors are from these workers who have enough practical experience to handle the process and

production. There are only a few degree holders among these supervisors. They have degrees like B.Sc., M.Sc., and diploma in Chemical Engg. The only advantage the supervisors with the degree have is that they can explain and understand the things more clearly & quickly and also explain the modifications suggested by them as they have the required theoretical background for them.

Plant & Machinery

Almost all the firms have machinery which is made in India only. There are many suppliers in the Makarpura, which is 25 km. from Nandesari GIDC, who manufacture required vessels, filters, dryers, screening machines, etc. for these firms. The glass lined vessels are manufactured in Vidhyanagar which is at a distance of 60 km. from Baroda. These firms have not even tried to import machinery because it is costlier and the minimum capacity for which these can be installed is for medium scale & large scale manufacturing. There is no automation done by these firms for process control. They have indicators for pressure, temperature, etc., but the process has to be monitored continuously and process control has to be done manually. Therefore, as mentioned earlier, these firms require skilled workers to do so. These firms have started working in eighties. There has been continuous upgradation in manufacturing process of H-acid because of changing trend in exports. Earlier it was exported as crude and not in powdered form, but now it has to be sent in powdered form only. Hence they had to install filters and dryers required for the process. Apart from that, there is very little modernisation in the manufacturing process by other firms. Some of the units in Nandesari have expanded. For example, a firm manufacturing disperse dyes, Chamunda Dychem, has increased its capacity from 80 TPA to 120 TPA and other units have done similar kind of expansions.

There is no vertical integration done by the small scale firms at Baroda. The reason given by them is that raw material required by them is easily available and also there are number of buyers for their products.

Marketing of The Firms

As already mentioned, most of the small scale units do not have any specialised person for marketing. They also spend very less for marketing purpose and is typically around 0.5 % to 1 % of the total costs. The number of firms which have employed persons for marketing are very less. This helps the owners of these firms to concentrate on other activities and planning. The other firms have not employed marketing persons as the owners feel that it is not necessary as they can handle all the operations. As the dyes & dyes intermediates are industrial products and not the consumer products, the marketing has to be done by personal visits and contacts. A very few firms in Baroda do advertising in the magazines specially meant for the chemical industry like Chemical Weekly, Dyechem etc. They are spending around Rs. 2000 to Rs. 3000 per annum on advertisements which is very negligible amount in total costs. The number of firms giving advertisements is very less, because they think that giving advertisements does not help very much. But the firms giving the advertisements do admit that they are getting more inquiries about their product than before and which helps them to know about more buyers. The main buyers of the small scale firms are traders and the small scale firms in the direct consuming industries.

One important thing to be noticed is that the selling by the firms in dyes and dyes intermediate industry is done mostly by credit and discount. The credit time ranges from 30 to 120 days and discount of 2 % to 3 % is given for the payment in cash. But due to high bargaining power, the buyers generally are not giving payments on time and hence the working capital required by the firm is more to maintain their normal operation. The

suppliers of the main raw material require the payment to be in time as these suppliers are having higher bargaining power, this adds to the financial requirement of the firms.

Role of Traders

Traders play an important role for small scale manufacturers for their product export as well as marketing. Small scale units do not have direct market channel or distribution of their product. These traders buy from the small scale units and then they sell it to the final consumers. The small scale firms in Baroda are selling more than 75 % of their production to these traders. The main reason being the timely payment by them. If the payment is not made in time, then these traders are providing raw materials to the manufacturers which helps these firms to maintain normal operation. There are many traders in the area of Bombay, Hyderabad, Ahmedabad, Madras and in other big cities. These traders deal in all type of chemicals and have linkages all over the world. They have direct contact with the customers as well as with other traders.

The export for the firms in Baroda is totally done by these traders. The export incentives are not passed on to the firms as these are mostly merchant exporters. These traders send the samples of the product to the customers as well as other traders in the international market and the price. If the sample is found to be of good quality and the prices are competitive with the international market, these buyers send trial order for the material. After satisfaction with the trial order, they give order for larger quantity. Once the reputation of the traders or the manufacturing firm as a reliable supplier is established, then they receive regular inquiries and orders from the international buyers. Generally, these orders are in terms of Full Container Load (FCL). One FCL means 15 to 20 tonnes. These small scale firms alone can not provide that much quantity because of their less production capacity. For supplying one FCL they will have to store at least one month of production, which raises working capital requirements. This limitation prevents them from getting direct orders from international buyers.

The export requires certification for quality from established firms like Eta Labs, Bombay etc. Some of the firms at Baroda do testing of their product at their production site to ensure the quality of their product.

Subsidies & Concessions to Small Scale Firms

The small scale firms compete on the basis of prices to gain the market share. They were able to do so because of the concessions given to them. The advantage to the small scale is of the subsidies and of excise duty concessions given to them. The subsidies given are :

Interest subsidy on loan for machinery	- 50 %
Electric rate subsidy	- 50 %
Testing equipment & testing fees	- 50 %

The excise duty concessions given to the small scale units is given in the table below :

Table 5.4
Excise Duty Concessions to The Small Scale Units

Annual turnover	Excise duty
less than 30 lakh	nil
30 lakh - 50 lakh	5 %
50 lakh - 1 crore	10 %
1 crore - 1.5 crores	15 %
1.5 crores - 2 crores	20 %
above 2 crores	normal rate

But the small scale firms claim that these excise duty concessions do not help them very much as the buyers of the material can not claim more MODVAT. The benefit of MODVAT is that the manufacturers can claim back the amount of excise paid by them on raw materials while paying excise on the finished product.

The other benefit the small scale units had was that they were able to get away from the pollution control board due to their small size of pollution and also by corruption. But now the scenario is changing and these firms have to install pollution control equipment. The changes in the pollution control norms has been discussed in the Chapter 6.

The third benefit the small scale manufacturer have is that of less overheads as compared to the medium scale firms because they have less staff and professional people to handle the operation.

Hence, to avail all the above mentioned benefits, the firms have remained in small scale. Following examples will prove this point :

There is a firm which is making vat magenta and that firm proprietor has three other firms which are making the same product. Each unit has investment on plant and machinery around 10 to 12 lakh and is manufacturing around 20 to 30 TPA. They want the units in small scale only. The reason given by them is that the users of vat magenta, manufacturers of vat dyes are exempted from excise and hence they cannot take the benefit of MODVAT. Therefore, to be competitive these firms have to avail the benefit of excise exemption for small scale. But this is not the case. The manufacturers of vat dyes who are exempted, are the ones in small scale only. The other benefit they have is that even if one of the units has some problems due to pollution control, they can continue their production in the other units. Another similar case is with four units manufacturing H-acid.

But now with the changes in governments' excise , pollution & other policies, these firms are facing rise in cost of production & this will take away the price advantage from the small scale firms.

5.5.2 Medium Scale Firms

There are 5 to 6 medium scale firms in Baroda. These units are manufacturing mainly H-acid, vinyl sulphone & benzanthrone. These firms are defined as the firms having investment more than Rs. 60 lakh.

Installed capacity & production

The installed capacity of these firms varies from 600 TPA to 2400 TPA & the investment on plant and machinery ranges from Rs. 80 lakh to Rs. 3 crore. The production and installed capacity of these firms for the year 1993-94 is as given below :

Table 5.5

Installed Capacity & Production of Medium Scale Firms At Baroda

Product	Installed capacity (tones)	Number of units	Production (tones)	% utilisation
Vinyl sulphone	3400	2	2500	73.5
H-acid	1200	2	930	77.5
Benzanthrone	675	1	495	73.3
Other products	3900	2	2680	68.7

From the table 5.4 & 5.5 it can be seen that the capacity utilisation of the small scale firms is better than that of the medium scale firms.

Organisational Structure

Here there is a remarkable difference in organisational structure between the medium scale firms and small scale firms. In medium scale firms, there are departments or so as to say persons looking after individual work like marketing, purchase, finance, production and administration. These are small departments consisting of tow to three persons. The fig. 5.2 shows a typical organisation structure.

In this firm, all the activities are headed by the MD and each activity is given to a department consisting of two to three persons. The marketing department consists of five persons and two persons are looking after the domestic market, two after the export and the fifth person heads the department and coordinates the activities of the department. Each person holds an MBA degree and has good experience in marketing. The production is looked after by the factory manager who has enough experience to handle the factory administration. He is assisted by an engineering department head and senior production supervisor in production. There is a supervisor for each shift and he looks after the production as well as packing of the material. The total number of staff in this firm is 35 and permanent workers is 50.

There is some office automation in the medium scale firms. These firms do use computers for their accounting and now they are thinking of using computers for management information system, forecasting, finance, operations management, etc. The investment on computers and printers varies from Rs. 4 lakh to Rs. 6 lakh.

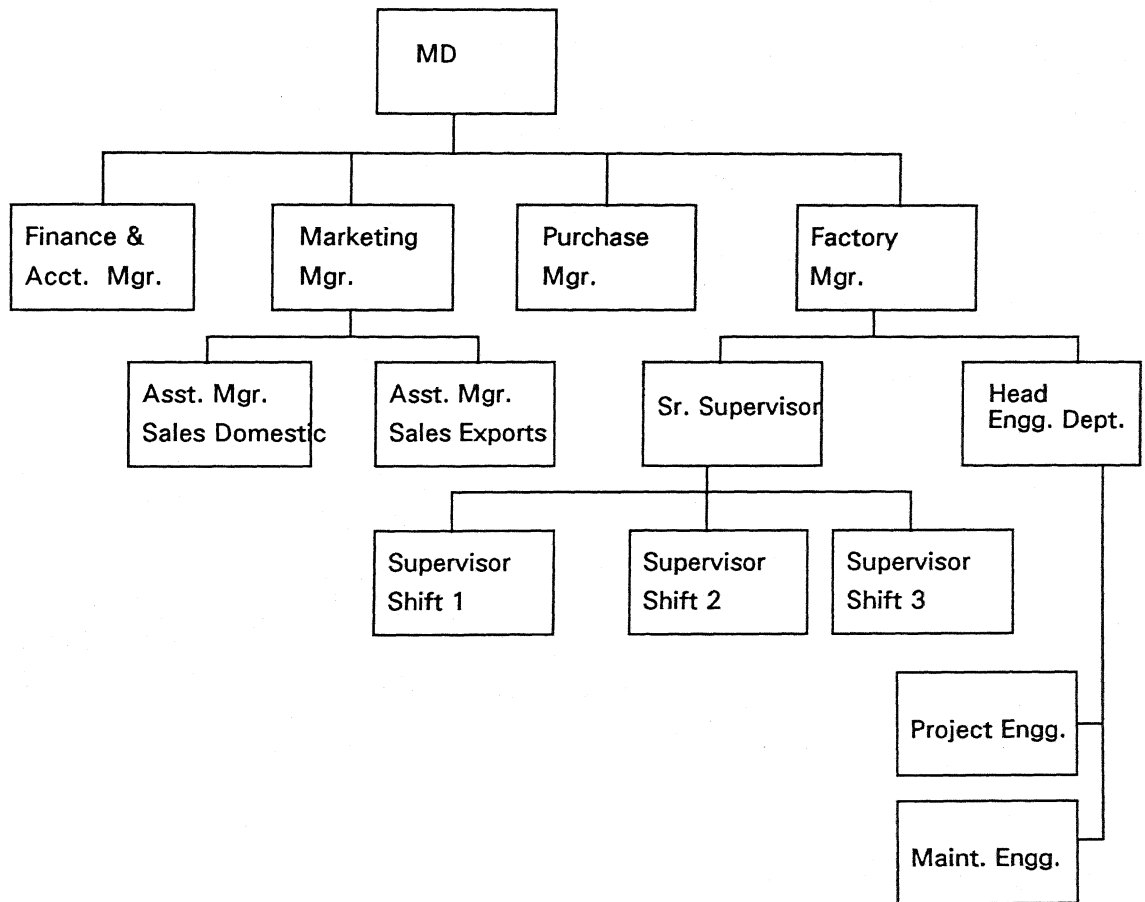


Fig. 5.2

ORGANISATION CHART

At the plant, these firms have supervisors which have both, practical as well as theoretical knowledge about the process and production. These firms also have employed chemical engineers and instrumentation engineers having enough experience so that they can suggest process modifications, automation and to handle new projects. The number of workers vary from 25 to 35 per shift. The number of skilled workers required by these firms are less as compared to the small scale firms. These firms have around 15 % of their workers as skilled workers. This is because of automation of process control done by the firms.

Plants & Machinery

These firms have started working in eighties. They have machinery which is made in India only. They have done process automation of their processes. There have been no major modernisation done by them. A firm has a vertical integration to manufacture benzanthrone and benzoic acid i.e. it is also manufacturing anthraquinone & benzal chloride which are the main raw materials. The advantages of the vertical integration is explained in Section 5.5.3.

Marketing

In a medium scale firm, the area near Baroda like Surat, Ahmedabad, Vapi, Ankleshwar etc.; are covered by the marketing department. But Bombay, Hyderabad, Delhi are also major markets for the dyes. To have better representation, the medium scale firms have employed one to two persons in these cities. They are helped by the main office executives by after sales visits to these cities. These firms also supply through traders and agents. The traders and agents are working on a margin of 2 % to 3 % as their commission. Hence the geographical spread of the medium scale firms is much more than the small scale firms.

The export is done by both ways, that is through traders as well as directly to the consumers. But the major share of exports is through consumers. These firms are trying to get more and more orders directly but the competition from within India restricts the number of orders. There are many firms which are exporting and the small scale firms are able to supply at lower prices. Also the traders have established good relationship with the buyers, which help them to get orders.

The typical expenditure these firms do on marketing is around 2 % to 3 % of total production cost. They also place advertisements in magazines like Chemical Weekly, Dyechem, etc. They also participate in the trade fare organised by Chemexil in India and abroad. This helps them to know more about their buyers and to establish contacts with them.

The effects of government policies are explained in the Chapter 6. Some of the medium scale firms have become public limited companies, for example Nandesari Rasayanee Ltd., Orient Chemicals Ltd, etc. The other firms are planning to become public limited companies in order to finance their modernisation and expansion plans. These firms are also planning for vertical integration.

5.5.3 Integrated Firms

The firms with backward integration are very few in Baroda. One of the reason being that most of the firms are small scale and the investment required is such that it will bring them out of the small scale. The backward integration also requires working capital to be more. The other reason being that all these firms are one man show. Hence it becomes difficult for them to handle too many products at a time. Also the capacity of these firms is limited i.e. they are producing around 10 to 20 TPM which is not sufficient quantity to achieve economies of scale. The other thing which limits the expansion or vertical integration is that these unit will have to set up another plant as they do not have enough space within the existing unit to set up another product or to expand. The third

thing being that due to increase in pollution control laws implementation and strictness, the units fear the increase in cost of production to such a level that if they go for different units, they will not be able to compete in the market. These are the reasons pointed out by small scale firms not to go for vertical integration.

The firms with the backward integration have the advantage of sharing of pollution control equipment & effluent treatment plant. Also they have the advantage of economies of scale as the total number of workers required are less as compared to individual units. The other advantage being sharing of overheads by number of products so, the production cost per product is less. The third advantage is that the production cost of final product is less as the units do not have to pay excise on the in house products and they can have benefit of MODVAT on other raw materials. Also they do not have to depend on market for raw materials for final products. The advantage of producing right quality material is always there. The firm having backward integration in Baroda is Orient Chemicals Ltd. The operation of the firm is similar to the medium scale firms, explained in Section 5.5.2.

5.5.4 Export Oriented Units

There is a unit set up by Huebach Ag, Germany in Ankleshwar near Baroda. They are setting up their office at Baroda. It is a 100 % EOU and have started operation from Jan. 95. They are planning to manufacture phthalocyanine blue and are manufacturing phthalocyanine green. they are planning to produce around 2400 TPA of both the products. They are manufacturing these dyes here and supplying them to their parent company and from there it will be distributed all over the world. They have branding of their product at their parent company.

They have imported all the capital goods required for their production. The plant is totally automated with digital control system. The technical know-how is supplied by the parent company. They have got an R & D department which is working on the improvement in process to get better yield and process control.

At present, they are procuring their raw material from Indian markets only. But being an EOU they have the advantage of importing raw material from other countries at zero import duty. They do not have any plans for vertical integration as of now.

They have installed both primary as well as secondary treatment plant with the latest technology from Germany. They will start their blue project only after installation of pollution control and treatment plant for that product which will take Rs. 1 crore of investment for this purpose. They are having this much investment only for pollution control as they feel that in coming years the pollution control standard are going to be stricter and they want to have all the possible precautions for that.

After successful completion of these two projects, the company is planning to go for other ranges of dyes.

5.6 INTENSITY OF RIVALRY AMONG EXISTING COMPETITORS

The industry is populated by number of firms. The small scale firms were competing on the basis of price and they undercut the prices to achieve the market share. Also the dyes & dyes intermediates are standardised products and the buyers find it to change the suppliers. This resulted in intense competition among these small scale firms as they were able to match the prices. They were able to do so at the cost of quality and because of concessions given to them as explained in Section 5.4.1. Also the international buyers were buying crude dyes from India upto recent times. Due to these factors the small scale firms were able to compete with the medium scale firms. Now as the sourcing of finished dyes is increasing, the small scale firms will find it difficult to compete with the medium and large scale firms. In the survey it was observed that the small scale firms are supplying to the small scale firms in the consuming industry and large and medium scale firms are supplying to their counterparts in the consuming industries. Thus these two operate in two different segments of the market.

The future for the dyes & dyes intermediates manufacturers is bright, as explained in Section 2.6. But now the emphasis is on reaping economies of scale and establishing the brand names in the international market. Also due to changes in government policy, as explained in Chapter 6, the small scale firms will find it difficult to compete with the medium scale and large scale firms.

CHAPTER 6

GOVERNMENT POLICIES & THEIR EFFECT ON THE INDUSTRY

6.1 INTRODUCTION

There have been major changes in the government policies in the last four years. The effect of these changes on the dyes and dyes intermediates industry are discussed in this chapter. The policies discussed are pollution control policy, policy regarding excise duty, import/export policy, reservation policy for SSI firms, new small enterprise policy, banning of certain toxic items & licensing policy.

6.2 POLLUTION CONTROL POLICY

Government had launched a project to check industrial pollution in 1991. This project was financed by the world bank and the union government. The total project finance was \$ 335.6 million of which, \$ 155.6 million was given by the world bank and rest of the amount was given by the union government. The states covered under this project were Tamil Nadu, Gujarat, Uttar Pradesh & Maharashtra. The money was spend on providing loans to individual industrial units for setting up pollution control equipment, to strengthen the state pollution control boards, for setting up common effluent treatment plants for cluster of small scale units, & for training and studies. Now the second project is being launched which will cover Karnataka, Andhra Pradesh, Madhya Pradesh & Rajasthan. This project is financed again by both, the world bank and the union government. The world bank will give \$ 143 million and the union government will contribute \$ 187 million aggregating \$ 330 million for the project. This drive has made the implementation of pollution norms stricter.

6.2.1 Changes in pollution control norms

Gradually, the government is getting stricter about the pollution control norms. The changes for air pollution control is as shown below :

This is regarding air pollution control of the units manufacturing cuprous chloride, an important intermediate for phthalocyanine blue.

In 1986 :

<u>Parameter</u>	<u>Source</u>	<u>Tolerance limit</u>
Chlorine	Chimney	5 PPM
Hydrogen chloride	Chimney	25 PPM

In 1992 :

[1] The process emission through various stacks/vents of reactors, process, vessels shall confirm the following standards (from scrubber with a stack height of 18 mtrs):

<u>Parameter</u>	<u>Tolerance limit</u>
Chlorine	9 mg/Nm ³
Hydrogen chloride	20 mg/Nm ³
Particulate Matter	150 mg/Nm ³

[2] The concentration of the following parameters in the ambient air within the premises of the industry shall not exceed the limits specified here under :

<u>Parameter</u>	<u>Permissible limit</u>
Suspended particulate	500 microgram per cu. m.
Chlorine	100 microgram per cu. m.
Hydrogen chloride	200 microgram per cu. m.

In 1994 :

Every limit is same as that of 1992 except about suspended particulate. It is changed from 500 to 200 microgram per cu. m.

As shown above, the laws are changing and the permissible limit for waste and effluent is becoming more and more stringent.

6.2.2 Effects of changes in pollution control norms and implementation

The manufacturers in organised sector have installed and some are installing the pollution control equipment & effluent treatment plants. The subsidiary set up by the foreign firms have the best pollution control & effluent treatment facilities. Hence these firms will not face problems as far as pollution control is concerned. But most of the small scale units are not having the pollution control & effluent treatment equipment. At present 40 % of the units in Nandesari are on the closure list given by the Gujarat Pollution Control Board (GPCB). Previously the small scale units were not forced to install effluent treatment plants and they used to escape from the GPCB through corruption. This was the trend almost everywhere in Gujarat but now even if these manufacturers are offering money to the GPCB people, they are not accepting the negligence of the pollution control. This is mainly because the pressure on GPCB is increasing from the state government as well as the central government. The central government has issued notices to the worst pollution GIDCs which are Vapi, Vatva & Ankleshwar to curb the pollution. Therefore, the GPCB people are acting in accordance with the laws as they have the fear of loosing of their jobs.

Apart from this, the awareness about the pollution has increased among the people and they are not accepting any unit producing any kind of pollution. Because of pressure both from GPCB & people, these units are forced to install the requirements for pollution control & effluent treatment. To encourage these firms to install the pollution control equipment, the state government is providing 100 % subsidy to them on equipment. But

the effluent treatment requires higher variable cost as it involves treating the effluent with chemicals like caustic soda to neutralise it, which are higher in cost and the operation requires higher electricity utilisation and extra man hours. Because of this, the production costs of the firms are going up. As a result, these units are losing the advantage which they had vis-à-vis organised sector and medium scale firms.

Around 4 units in Nandesari have closed down due to the closure notice served by the pollution control board as they were unable to install the required pollution control equipment.

6.2.3 Role of NIEA

There is an effort by the small scale manufacturers to have common effluent treatment plant for themselves. Nandesari Industrial Estate Association (NIEA) has started an effluent treatment plant. The finance for installation was done through scheme for promotion of common effluent treatment plants in cluster of SSI units promoted by central government. The procedure & objective of the scheme is given in Appendix 5. The other finance for running of plant is done through contributions by the SSI firms. In this plant almost all the dyes & dyes intermediate units are treating their effluent. NIEA also keeps regular checking to ensure that the air pollution is controlled by every unit & is in operation all the time. The checking is done by the committee selected by the NIEA members. This committee makes surprise visits to the units and takes samples from scrubber and test them. If it is found that the pollution control is not done properly, they serve notices to units to correct the faults and if the units do not follow the instructions, the NIEA informs all the members not to co-operate and to GPCB about the irregularities.

6.3.4 Working of GPCB

The checking by the GPCB people is by surprise visit i.e. a non-schedule visit and generally they have at least one such visit in a week. The board also gives enough time for

installation of the pollution control & effluent treatment equipment and considers few days for extension but after one or two extensions the board takes the proper action as explained below

If the units do not follow the notices, the closure is forced by the pollution control board by having their power supply cut off through Gujarat Electricity Board (GEB). It also gives notices to respective GIDC to cut down other facilities like water supply, security, etc. Also the GPCB requests the NIEA to take proper action and for non co-operation of the units.

One thing pointed out by them is that when they visit one particular unit in Nandesari, the information that GPCB people have arrived spreads & the units which keep their control equipment non working start the functioning of the equipment. Because of this, the GPCB people do face the problem of getting true information about the units even after installing the equipment, whether they are actually operating them or not. As a solution to this problem, the GPCB people are planning to have checking with more people and at various units at a time, to increase the inspection, and also to check the units at night.

Thus, the changes in the pollution control policy and its implementation has forced units to install and operate the pollution control equipment and effluent treatment plant.

6.3 EXCISE DUTY STRUCTURE

As a part of on going reforms government has reduced the normal rate of excise duty on dyes & dyes intermediates in the last three years. Government has reduced excise duty from 34.5 % in 92-93 to 25 % in 93-94 and to 20 % in 94-95. It is expected that there may be further reduction in the excise duty by the government. This has resulted in increase in the exports (Appendix 3) by the industry and has encouraged the efforts of consumers of dyes & dyes intermediates industry in developed countries to source their needs from India. This reduction in excise duty has resulted in decrease in difference of

excise duty between the small scale sector and the organised sector. This in turn has resulted in taking away one of the benefits from small scale firms as can be seen from Table 5.4. This reduction in excise has also resulted in decrease of prices as shown in table below :

Table 6.1
Wholesale Price Index (1981-82 = 100)

Year	All Commodities	% change	Dyestuffs & Indigo	% change
1982-83	104.9	4.9	100.6	0.6
1983-84	112.8	7.5	103.5	2.9
1984-85	120.1	6.5	108.6	4.9
1985-86	125.4	4.4	119.8	10.3
1986-87	132.7	5.8	128.7	7.4
1987-88	143.5	8.1	134.0	4.1
1988-89	154.3	7.5	138.5	3.4
1989-90	165.7	7.4	152.7	10.3
1990-91	182.7	10.3	161.1	5.5
1991-92	207.8	13.7	191.4	18.8
1992-93	228.7	10.0	218.1	13.9
1993-94	247.4	8.2	222.3	1.9
1994-95	268.3	10.8	216.5	-2.6

Source : CMIE

As already mentioned in Section 5.3, the future of domestic market for dyes and dyes intermediates industry is linked with future of textiles industry, whose prospects have brightened after the proposed budget proposals for 1993-94 and 1994-95. These proposals are regarding the duty adjustments effected in respect of various textile fibers/yarns. Also the budget proposals for year 1995-96 have proposed to cut down

excise duty on xylenes from 30 % to 10 % and reduction in yarns /fibres excise duty also has been proposed. This will bring down the prices of the yarns/fibres which will result in decrease in prices of textiles. Due to this, the demand of the textiles is going to increase both, domestically and internationally. Therefore, an increase in demand of the dyes is also expected. The other consuming industries are also reported to be faring well, raising hopes of good demand for various dyestuff in coming years. Due to these changes, the consumption of the dyes is going to increase and is projected as below

Table 6.2
Demand Projections (in tonnes)

Year	Dyes			Dyes intermediates		
	Local	Export	Total	Local	Export	Total
1989-1990	40,065	8,000	48,065	99,698	10,000	109,698
1994-1995	49,980	11,000	60,980	128,031	13,000	141,031
1999-2000	61,110	13,000	74,110	152,862	16,000	168,862

Source : Prospective plan for chemical industries, volume 4

6.4 EXPORT POLICY

The main export incentives given are of duty drawback and advance license. Due to advance license, the dyes manufacturers are able to source raw materials for their product from world market with zero import duty. This has resulted as a leverage for the firms exporting dyes. Due to this, the manufacturers of dyes intermediates are facing stiff competition. The other export incentive is of duty drawback i.e., exporters can claim some percentage of the excise duty he has paid on the exported goods. The merchant exporters

are not able to pass on the incentives to the manufacturers as they are not permitted to do so. Only exports houses can do so. The small scale firms are mostly supplying through merchant exporters and hence they are unable to get these incentives. This may be one of the reasons due to which the small scale manufacturers resort to take excise benefit to remain competitive. They feel that by allowing merchant exporters to pass on the incentives will help them to increase their share in exports.

6.5 IMPORT POLICY

The refineries were protected from the international competition initially but after their growth, they were given stiff competition from the international firms by having zero import duty on basic chemical feed stock like benzene. But as the capacities of these firms were increased, they were again protected from the international competition by imposing import duty. But with the economic reforms going on, government has decreased import duty considerably on these raw materials. The table below shows the changes in the import duty :

Table 6.3
Import Duty on Raw Materials

Product	1986-87	1988-89	1990-91	1992-93	1994-95
Benzene	0 %	0 %	25 %	20 %	15 %
Toluene	60 %	50 % + Rs. 10 per kg.	50 % + Rs. 10 per kg.	50 %	30 %
Xylenes	100 %	100 % + Rs. 25 per kg.	100 % + Rs. 25 per kg.	65 %	30 %

These import duty cuts are likely to continue and hence the manufacturers of dyes & dyes intermediates are finding new suppliers in the form of imports.

The dyes and dyes intermediates manufacturers are also protected from the international competition. The import duty on these products have been reduced but it is still high. Table below shows the import duty for dyes & dyes intermediates :

Table 6.4
Import Duty on Dyes & Dyes Intermediates

Year	86-87	88-89	90-91	92-93	94-95
Tariff	150 %	150 % + Rs.15 /Kg.	150%	65 %	65 %

The manufacturers feel that the cut in import duty should continue. This will result in reduction in cost of production as the price on raw material will reduce due to internal competition. The duty cut will result in competition from different countries, but they feel that they can survive this competition.

6.6 FOREIGN DIRECT INVESTMENT & TECHNOLOGY TRANSFER POLICY

The government has simplified the procedures for foreign direct investment & technology transfer. This simplification of procedures has attracted foreign firms like Hoechst, Huebach, BASF, Sandoz, etc. to invest more in India. New firms like Huebach have started operation in India. The firms which already have subsidiary in India like Hoechst, Sandoz, BASF, etc. are planning to invest more to modernise the process and for expansion. BASF is planning to invest Rs. 100 crores to manufacture leather chemicals, which includes metal complex dyes excluding those reserved for small scale sector. Also firms like Mardia Chemicals and Metrochem are having technical knowledge and equipment from countries like Germany, Japan, etc.

Apart from this, there are many companies which are attracted by governments' economic reforms regarding foreign direct investment & technology transfer, like Shell which is planning to set up refineries in joint collaboration with Indian firms. This will increase the number of suppliers for the dyes & dyes intermediates industry.

6.7 RESERVATION POLICY FOR SMALL SCALE SECTOR

The government has reserved a number of dyes for small scale industry to encourage the entrepreneur to set up the units (Mansingh, 1994). This has resulted in increase in number of small scale firms and has prevented large scale and medium scale firms to set up units to manufacture these dyes. The medium scale and large scale firms can set up units to manufacture these dyes only if they can export 75 % of their production per annum within three years of their starting of operation.

6.8 NEW SMALL ENTERPRISE POLICY (NSEP)

One of the special features of the NSEP, 1991 is the introduction of new legal form of organisation of business, namely, restricted or limited partnership. In this form, the liability of at least one partner is unlimited, whereas other partners have their liability limited to investment capital. This is a welcome provision. It will attract equity capital specially from friends and relatives of the entrepreneurs of small scale units who may like to help their kith & kin, but who fight shy because of unlimited liability in the partnership firm. On the other hand, small units short of funds but wishing to avoid sharing of decision-making will welcome augmentation of risk capital from such sleeping partners.

6.9 PROPOSAL FOR BANNING OF CERTAIN DYES BY GOVERNMENT

With effect from 1st January 1995, West Germany has banned material to be imported, produced or traded if it is dyed or printed with azo dyes which can produce following amines on decomposition.

4-Amino Diphenyl Benzidine
4-Chloro-o-toluidine
2-Naphthylamine
O-Amino azo toluol
P-chloro aniline
2,4-Diaminoanisole
4,4-Diamino diphenylemethane
3,3-Dichlorobenzidine
3,3-Dimethoxybenzidine
3,3-Dimethyl benzanidine
3,3-Dimethyl-4,4-Diamino Diphenyl methane
P-Cresidine
4,4-Methylene-bis-(2-chloroaniline)
4,4-Oxydianiline
4,4-Thiodianiline
O-Toluidine
2,4-Touylene diamine
2,5,5 Trimethyl aniline

Now that Indian government is also thinking of a similar ban, the dyes manufacturers producing these dyes will have to close down and also the export of textiles will be affected due to the ban. This represents an opportunity to manufacturers of other dyes which produce similar shades of colours but are costlier to make. Mayur dye-chem, a firm based in Ahmedabad, has come out with the dyes having similar colour producing quality and is expected to begin production of these dyes in the Jan., 1996.

6.10 GOVERNMENTS' LICENSING POLICY

For setting up of any firm or unit, a license has to be taken from government of India. Through this policy, government can restrict the number of firms in a particular industry and the location of the firm. This policy also affects the installed capacity of the firms. Through this policy government can allow a firm to establish very high economies of scale. In case of dyes & dyes intermediates industry, this policy has restricted the installed capacity of the firms. In west, there are companies which have very high economies of scale. For example in Germany, Hoechst, BASF & Bayer produce around 1.7 lakh tonnes of dyes annually. This kind of economies of scale are not present in India.

The policy has also restricted the number of private firms in setting up of refineries. But now companies like Reliance and NOCIL are setting up refineries which government has allowed. Thus it will increase the number of suppliers for the dyes and dyes intermediates manufacturers.

Also, the government is now allowing firms to set up higher capacities to manufacture dyes & its intermediates. Companies like Metrochem and Mardia Chemicals are setting up plants with capacities like 4600 TPA with an investment of Rs. 85 crores and 7000 TPA with an investment of Rs. 350 crores, respectively which includes other chemical products also. This capacities can be considered on the higher side in the Indian scenario. Similarly Serene Dyestuffs has expansion cum diversification plan worth Rs. 67 crores and many other firms like Atul Products, Colour-chem, Beta Naphthanol, Sudarshan Chemicals, IDI, etc. have expansion plans. This expansion and diversification with vertical integration will change the structure of the industry.

Due to changes in the governments policy the number of suppliers for the dyes & dyes intermediates industry are increasing in form of imports and new units. Also the government policy has increased demand of the dyes internationally as well as domestically. The structure of the industry will change due to encouragement by

government to reap the benefits of the economies of scale as well as vertical integration to the organised sector. The government pollution control policy has also created the need to go for economies of scale. These changes will make difficult for small scale firms to compete in the market.

CHAPTER 7

CONCLUSIONS

7.1 RESEARCH QUESTIONS

The broad research questions were aimed to find out the current status of the dyes and dyes intermediates industry, its structure and the operation of different groups in the industry. The impact of the changes in the government policies on the industry was also addressed in the research.

7.2 SCOPE/METHOD OF STUDY

The scope of the study includes the dyes and dyes industry at Baroda. Baroda is one of the major centres producing dyes & dyes intermediates in India. Also, at Baroda it was easy to get in touch with the dyes & dyes intermediates manufacturers through a contact. Hence, it was chosen as the centre for study.

Since the research questions generated were mainly of the form - " what", a broad based and survey oriented research strategy was found to be the most appropriate. It was decided to collect necessary data by conducting a non schedule - structured interview.

7.3 FINDINGS OF THE STUDY

1. The dyes and dyes intermediates industry in India has bright prospects in coming years in domestic as well as the international market.
2. The entry barriers for this industry are economies of scale, product differentiation, access to distribution channel and government policies such as pollution control policy, licensing policy & reservation policy for SSI units (only for large scale to medium scale firms).

3. The bargaining power of suppliers is high due to concentration, negligible consumption of basic feed stocks by dyes and dyes intermediates industry, no substitute inputs & impact of input on cost of production in the industry.
4. The bargaining power of buyers is high mainly because of two factors : there are so many suppliers that they find it easy to switch from one supplier to other, and credible threat of forward integration.
5. There are four groups which are prominently present in the industry. Each group has its own advantage. Small scale firms have advantage of subsidies and concessions given to them, medium scale firms have advantage of economies of scale, vertically integrated firms have the benefit of economies of integration, whereas the export oriented units have the benefit of imports of capital goods as well as of raw materials with zero import duty. They follow different strategies to take full benefit of these advantages. Also the market segments for these groups are different : small scale firms supply mainly to small scale firms in the consuming industries and traders, medium scale firms are supplying to their counterparts in the consumer industries whereas export oriented units have their focus on the international market only.
6. Changes in the government pollution control norms and their strict implementation have made it difficult for small scale firms to keep their cost of production down. The excise duty changes for the industry have reduced the benefits of excise concessions to the small scale firms. Also the demand for quality dyes is increasing. All these factors have made it difficult for small scale firms to compete against the large scale and medium scale firms.
7. The government licensing policy & reservation policy have limited the capacities of individual firms. But now due to above mentioned changes, the economies of scale is becoming important. Also, the government is encouraging the firms to achieve the economies of scale.

8. Due to changes in government import policy, the firms are finding new sources of raw materials. Also due to changes in licensing policy, new refineries by private sector firms are coming up, thus increasing the domestic supplier for the raw materials.

7.4 SUGGESTIONS OF THE STUDY

The organised sector needs to quickly expand capacities & reap the advantages of economies of scale as well as vertical integration. This will also help them to compete in international market. Many firms are doing just that. This will change the structure of the industry.

The reduction in import duty on dyes intermediates will affect the industry. This will bring down the cost of these intermediates, bringing down the cost of production of dyes. This will also provide an experience of international competition to the Indian firms.

The permission to pass export incentives to the manufacturers by merchant exporters will also help the firms in the industry to increase their export.

The Indian firms should try to establish their brand in the international market. This will help them to win customer loyalties. An effort to establish world wide distribution channel should also be intensified.

7.5 LIMITATION OF STUDY

- 1 The scope of this study is limited to the small scale & medium scale firms, the large scale firms are not covered in the study.
- 2 The number of firms covered are at Baroda only. This has limited the area covered by the study.
- 3 The other limitation is that no financial data is available to analyse the performance of the firms.

7.6 FUTURE SCOPE

The study can be extended to study National competitive advantage of the industry and its comparative position in the world market. If it is possible to get enough data, the study can be extended to fit different mathematical models to study impact of different variables on the performance of the industry.

APPENDIX 1

CLASSIFICATION OF DYES

1. Acid Dyes

These include those dyes which are the sodium salt of colour acids. The groups generally occurring in such dyes are sulphonic acid groups or phenolic group. The negative ion is responsible for the colour of the dye. Such dyes are used to dye animal fibres such as wool and silk directly. These are not very useful for unmordanted cotton and linen. Generally these dyes are used in acidic solutions and the fabric is dipped and strongly agitated in the hot solution of the dye in the presence of either an acid or its salt to get a uniform colour on the cloth to be dyed. Picric acid, Martius yellow, orange II, Naphthol yellow are some of the important dyes that belong to this class.

2. Basic Dyes

These are also called cationic dyes. This type of dyes are generally the hydrochloride or the zinc chloride complexes of colour bases. The colour of these dyes depends on the positive ion present in them. These dyes can be used directly to dye silk and wool but not unmordanted cotton and linen. Generally these dyes are applied in basic medium. Methyl violet, Crystal violet, Methylene blue, etc. are some of the dyes that belong to this class.

3. Direct Dyes

These are salts of colour acids. They get strongly adsorbed on cellulose. These dyes are not considered as acid dyes though they contain sulphonic acid group. This is because of the fact that the sulphonic groups present in them are not used for attachment of dye to the fibre. These are quite cheap and easy to use. An important member belonging to this class is Congo red.

4. Reactive Dyes

These form covalent bond with those fibres which possess hydroxyl or amino groups. In a particular class of such dyes, chlorine atoms are present which are capable of reacting with hydroxyl groups in cellulose when applied to it in presence of alkali. Orange azo dye is an example of such a dye. Another type of reactive dyes have activated vinyl groups which are also capable of reacting with cellulose hydroxyl group in presence of a base.

5. Vat Dyes

The majority of vat dyes are polycondensed aromatic carboxyl compounds, e.g., indanthrone and benzanthrone. These are insoluble in water but their reduced forms are found to be soluble in water. The reduced form can be obtained by treating it with some reducing agent in a large vat. The reduced form is then used for dyeing. The cloth to be dyed is dipped in the vat containing reduced form of vat dye. After some time it is taken out and allowed to oxidise where the oxidised form of the dye is formed within the fibre. Since the oxidised form is water insoluble such dyes are found to be exceptionally fast.

6. Sulphur Dyes

These can be regarded as special class of vat dyes because these are also insoluble in water and are used in their reduced form by a similar process as discussed in vat dyes. Sulphur Black is an important member of this class. These are cheap and are exceptionally fast.

7. Disperse Dyes

Since acetate rayon are obtained by acetylation process in which hydroxyl group of cellulose has been acetylated so the substantive dyes are not suitable for them. In acidic or alkaline solutions, there are good chances of acetate group being hydrolysed so the vat dyes and also the ingrain dyes are not suitable for acetate rayon fibres. Thus the disperse dyes which are colloidal solution of water insoluble dyes, but which are soluble in cellulose

acetate are most suitable for such fibres. Inoamines (an azo dye) is an example of such a dye. Terelyne is also dyed with disperse dyes.

8. Organic Pigments

These are mostly phthalocyanine dyes. These are relatively new class of dyes discovered in early part of this century. They have a close structural relationship to the natural pigments like the porphyrins and in common with porphyrins they form metal complexes. Transition metals, particularly copper, form the most stable complexes and so the most important phthalocyanine is copper phthalocyanine. These are very fast to light, heat, acids, alkalies, etc.; and find use in paints, printing inks, synthetic plastics, fibres and rubber.

9. Mordant Dyes

These dyes are always used after the prior treatment of fibre with some mordant such as salts of aluminium, chromium, iron etc. The mordant to be used depends upon the nature of the dye. If the dye is acidic then a basic mordant is used (salts of Cr, Al, Fe, etc.). If the dye is basic then an acidic mordant (tannin or tannic acid, etc.) must be used. For dyeing cloth is soaked in the mordant solution and then steamed to get mordant fibre. The mordant fibre is then dyed. The mordant that gets attached to the fibre combines with the dye to form an insoluble metal complex. Typical mordant dyes are alizarin and azo dyes.

10. Ingrain or Azoic Dyes

This refers to those dyes which are synthesised and so produced within the fibres. Since the azoic dyes are produced by azo coupling inside textile fibres, they are fast to washing. For dyeing with such dyes, the cloth is first soaked in a solution of phenol or amine and then is soaked in a solution of diazonium salt. The important example of Ingrain dye is Para red.

11. Solvent Dyes

This refers to dyes containing no sulpho or any other water solubilising group. They are soluble in organic solvents and are used for manufacture of stains, varnishes, ink lacquers, type writer ribbons, candles, soaps etc.

APPENDIX 2

CHANGES IN THE EXCISE STRUCTURE FOR DYES & DYES INTERMEDIATES

Year	Normal Rate of Excise (in %)	Excise Duty for Small Scale firms (in %)
1961-62 to 1962-63	15	15
1963-64	16.5	16.5
1964-65 to 1971-72	15	15
1972-73 to 1973-74	20	20
1974-75	24	24
1975-76 to 1976-78	30	30
1978-79	31.5	Nil upto Rs.5 lakh sales
1979-80	31.5	Nil upto Rs.5 lakh sales
1980-81	31.5	Nil upto Rs.5 lakh sales & 23.65 upto Rs. 10 lakh sales
1981-82	31.5	Nil upto Rs.7.5 lakh sales & 23.65 upto Rs. 15 lakh sales
1982-83 to 1985-86	31.5	Nil upto Rs.7.5 lakh sales & 15.75 upto Rs. 15 lakh sales
1986-87 to 1987-88	35	Nil upto Rs.15 Lakh sales & 25 upto Rs. 75 lakh sales
1988-89	36.75	Nil upto Rs.15 lakh sales & 26.25 upto Rs. 75 lakh sales
1990-91	31.5	Nil upto Rs.15 lakh sales & 21 upto Rs. 75 lakh sales

Source : Chemical Weekly Annual Number, 1991

APPENDIX 3

EXPORT TREND OF DYES & DYES INTERMEDIATES

Year	Export in Rs. Million
1969-70	15.3
1970-71	24.1
1971-72	24.8
1972-73	45.2
1973-74	81.0
1974-75	138.7
1975-76	105.0
1976-77	240.3
1977-78	238.2
1978-79	217.1
1979-80	282.7
1980-81	354.8
1981-82	324.4
1982-83	337.7
1983-84	464.3
1984-85	453.1
1985-86	485.4
1986-87	837.8
1987-88	1898.2
1988-89	4016.0
1989-90	5298.0
1990-91	4509.9
1991-92	7771.0
1992-93	9836.0
1993-94	11283.0
1994-95 *	14610.0

* Target

Source : Indian Data Base, Volume 1 & 2, 1989
Chemexil, various reports

APPENDIX 4

QUESTIONS FOR INTERVIEW

Questions to obtain respondents profile.

1. Year of establishment
2. Name of the owner
3. Reason for entering into this business
4. Number of employees
 - a. Managers & executives
 - b. Supervisors
 - c. Workers-skilled Unskilled
5. What are your products ?

6. Installed capacity & production:

Year	Installed Capacity	Production
1989-94		

7. Financial Status

- a. Turnover/Exports

Year	Turnover	% Export	Profit/Loss	Imports(if any)
1989-94				

b. Investments

- (i). Plant & machinery
- (ii). Working cap.
- (iii). Total investment

c. Sources of funds

- (i). Owner's equity
- (ii) Long term loans
- (iii) Subsidy

8. Technology & Facilities:

Major plant & eqpt.	Price (in Rs.)	Average age of machines	Source

- a. Collaboration, if any
- b. Testing facilities, if any

8. Whether any modernisation done in past ? If yes, then

Year	Facilities added or modernised	Investment made	Benefits derived
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9. Whether any modernisation needed in existing facilities ? (Details)

10. About suppliers

Raw materials	Source	Difficulties faced
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10. a) How do you do your purchasing ?

11. How many competitors are in the market for your product?

12. How do you remain competitive in the market ?

13. How do you evaluate your product in comparison to the competitors ?

14. How do you do your marketing i.e. by advertising, personal visits to the customer, etc.; ?

15. How much do you spend on advertising ?

16. How often do you visit your customers ?

17. What do you feel about the competition in the market ?

18. On what basis the competitors in the market compete ?

19. What is the percentage of marketing expenses in the total production cost ?

20. Do you have distributors for your products ? (Number)

21. Is there any kind of brand identity in your industry ?

22. What are the products for which brand is there ?

23. What are the problems in establishing a brand identity for your products ? (both domestically & internationally)

24. Do you have vertical integration for your products ? If yes, what are the advantages that you derive from it ?

25. If no, do you have any plan for the vertical integration ?

26. What are the problems in vertical integration ?

Exports/imports :

1. Do you export directly or through traders ? (trading channels)

2. How the export deal is made with traders or the buyers ?

3. Does export requires any special terms like product testing, ISO certification etc. ?

4. How do you compete with the manufacturers abroad ?

5. Do you have any advantage of advance license scheme for imports ?

Other information :

1. If the limit on investment on Plant & M/c is raised significantly, what changes ,you think will take place? (small scale industry)

2. Problems faced (if any) relating availability of capital goods & spares.

3. Impact of Industrial policy and export-import policy on availability of
a.Capital goods b. Raw Materials

4. Availability of technological support services in India (comments on existing status & problems faced due to this).

5. Has your unit ever tried to import machines ? (if yes, what problems were encountered in this process).

6. Does your unit import any quantity of raw materials ? (If yes, reasons)

7. Is there any significant change in the industry as the technology transfer, etc. are liberally available under the present import policy?

8. What is the justification for reserving certain dyes for S.S.I.s?

9. Is your unit trying for modernisation\expansion ?

10. Comments on the existing excise duty structure.

11. At present the import duty on dyes & its intermediates is 65 % ad valorem. If it is reduced, than how it will affect the market ?

12. What are the government policy changes that will have positive affect on the industry as well as performance of your firm ?

Pollution Control Policy

1. What was the initial reaction to the government decision of putting strict pollution control norms ?
2. What problems did the industry face due to various actions taken by the government in order to implement these norms ?
3. How are you coping with it ?
4. What was the role played by industry leaders ?
5. What was the role played by your association ?
6. How has your business been effected due to increase in expenses ?
7. What is the future plan of your company ?
8. What are the changes that you are anticipating in the policy ?

APPENDIX 5

SCHEME FOR PROMOTION OF COMMON EFFLUENT TREATMENT PLANT IN CLUSTER OF SSI UNITS

Objective

In the industrial estates set up or in other clusters of small scale industrial units, many polluting industries are located. These industries are polluting the environment through their effluents but some of them are unable to afford installation of pollution control equipment. The need for promoting demonstration projects for treatment of effluents and solid wastes discharged from Small Scale Industries (SSI) incorporating an integrated area-based approach for environment management, has been under the consideration of the Government. In order to encourage use of new technologies of Common Effluent Treatment Plants (CETP) for the existing SSI clusters of units a scheme for financial assistance has been formulated. This promotion scheme is being instituted for a period of five years, 1990-91 to 1995-96.

Criteria for Consideration for Assistance

- (i) Ordinarily, in an industrial estate or cluster of SSIs, one CETP will be promoted.
- (ii) Central assistance will be available only for those clusters of SSI set up prior to 1.1.1990.
- (iii) Projects for assistance will be prioritised on the basis of :
 - a. Toxicity of pollutants
 - b. Pollution load created
 - c. Number of units covered.
- (iv) The project should be self-financing for servicing of the loan and meeting operation and maintenance costs.

- (v) The project must formulate adequate institutional arrangements for cost sharing, recovery of dues and management and ensure observance of prescribed standards.
- (vi) The scheme must have the technical recommendation of the State Pollution Control Boards.

Pattern of Financial Assistance

- (vii) Central assistance upto 25 percent of the total cost of the CEPT would be provided as a grant to the SSIs on the condition that the State Government gives a matching contribution. The remaining cost should be met through equity contribution by the industries and loans from the financial institutions.
- (viii) Central assistance will be provided only for the capital costs. No assistance will be provided for recurring costs. The assistance will be released in three equal instalments. The first instalment of 25 percent of the assistance will be released when a body has been identified for the purpose of implementing the project, financial arrangements have been finalised, consent has been obtained from the State Pollution Control Board and State Government has committed contribution.

The second instalment of 50 percent and the last instalment of 25 percent will be released after utilisation of the previous money released and adequate progress of the work, subject to release of their proportionate shares by the State Governments.

The second and last instalment will be released only when utilistaion certificates for the previous instalments have been submitted and duly varified by the State Pollution Control Boards.

- (ix) It may be of advantage to combine some components of CETP with the municipal system. For one such scheme, the municipalities have to pay their share of the cost.

Procedure

The company will obtain loan from the IDBI (or other financial institutions). The company/IDBI will approach the State Governemnt/Central Government for their contribution of their subsidy. The subsidy would be released into the account of the company opened in the IDBI (or other financial institutions).

Source : Chemical Weekly, July 17,1994

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